

Online Teacher Professional Development: The Importance of Training to Deliver PD Online

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BOSTON COLLEGE
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Evaluation

ONLINE TEACHER
PROFESSIONAL DEVELOPMENT:
The Importance of Training to Deliver PD
Online

A Dissertation
by:

KARA SMITH

Submitted in partial fulfillment of the requirements for the
degree of Doctor of Philosophy

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ONLINE TEACHER PROFESSIONAL DEVELOPMENT: The Importance of Training to Deliver PD Online

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The most recent reauthorization of the Elementary and Secondary Education Act, the No Child Left Behind Act, focuses on the continued importance of teacher professional development. There are a great deal of challenges involved with delivering high-quality teacher professional development to all teachers, however, such as time, geography, and available resources. Online professional development is emerging in the literature as a viable alternative to traditional face-to-face online professional development. With the recent emergence of such a trend, however, very little research had been conducted on the quality of the individuals providing the online PD to teachers. The aim of this study is to examine one online facilitator-training program which was designed to train facilitators in the skills and best practices associated with delivering high quality PD to teachers across eight states. Using survey data collected over a two-year period, this dissertation explored the relationship between facilitator trainee ratings of training workshop quality and teacher outcomes of interest through a set of five regression equations. While only three of the relationships were found to be statistically significant, all provided valuable insight nonetheless. Specifically, the significant contributions include; a better insight into the relationship between training facilitators to deliver PD specifically in an online format and teacher perception of course quality, a series of tools to measure this relationship with other facilitator training programs in the future and, a contribution to the sparse literature currently available on this topic.

Dedication

I would like to dedicate this work to my mother. Her love, support, and example have persisted long after her passing.

Acknowledgments

There are a number of people in my life who have supported me and pushed me as I worked through this dissertation, I would like to acknowledge each of them here although they deserve much more than just my thanks.

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Chapter 1

INTRODUCTION

The federally mandated *Elementary and Secondary Education Act* addressed the national need for preparing and training high quality teachers and administrators. The most recent reauthorization of this bill, the 2001 *No Child Left Behind Act*, has reemphasized the need for expert teacher professional development (TPD) as it has reminded districts and schools that TPD is an important and necessary component of pre- and in-service teacher training that affects both teacher learning and student achievement (NCLB[2113(c)(2)(A-B)]). With continually changing student demographics, broad research and progress surrounding teaching techniques and best practices, and regular advancements in technology, ongoing teacher training should be an integral aspect of an educator's career.

Possibly more significant to teachers are the measures that have been put in place to ensure that students are receiving effective content delivery and that all students are meeting state standards. To that end the stakes related to teacher expectations and competency are dramatically heightened in this era of accountability. Therefore, teachers, policy makers, and administrators all agree on the importance of high quality TPD. The major issues stifling its implementation, however, are budget cuts, a lack of necessary financial resources, and inflexibility in teachers' demanding schedules (Sawchuck, 2008).

Title II, Part A of NCLB, *Improving Teacher Quality; State Grants in NCLB* was designed to promote and fund teacher quality programs that would ultimately result in all

classrooms being led by a highly qualified teacher. This section of the bill has allowed for increased flexibility in the use of federal funds distributed through Title II. Resources can be used for various purposes including recruitment, hiring, and professional development. Districts can decide how the money should be spent, as long as the chosen activities meet the bill's stipulations and are shown to lead to having a highly qualified teacher in every classroom. A 2008 study conducted by the United States Department of Education indicated that 97% of school districts in the United States received Title II funding in the 2007-2008 school year and 50% of all Title II resources were allocated toward TPD (United States Department of Education (U.S. DoE) 2008). Even with the allocation of Title II funding, however, districts remain challenged to find sufficient finances with which to deliver ongoing, individualized, high quality TPD to all teachers.

Due to these budgetary constraints, districts are looking toward alternative forms of teacher training. Tremendous innovation in communication technologies over the past two and a half decades has significantly impacted all levels of education by providing opportunities for instruction and learning that is ubiquitous and pervasive; TPD has been no exception. Online professional development (OTPD) is emerging as a valuable and cost effective alternative to traditional face-to-face TPD courses. Farrell (2001) and Barker & Dickson (1996) have remarked that exemplary OTPD courses allow for a blend of synchronous and asynchronous interactions. Such opportunities support continuous learning and promote reflective educators who succeed in building effective learning communities (Alexander et al., 1994; Hawkes & Romiszowski, 2001; Latchem, 2004).

Many of the features of traditional and online professional development are the same; the primary differences noted in the literature are the mode of communication and

the interactions between the facilitators and the participants (Smith & Trayner, 2005). Effective delivery of traditional, face-to-face TPD requires a set of specific skills. Many of those same skills are required for effective OTPD delivery, however teaching in an online environment requires facilitators to master additional skills and best practices (Stromso et al., 2007; Delfino & Persico 2007; Gaytan & McEwen 2007; Spatariu et al. 2007; Zembylas & Vrasidas 2007).

The benefits of OTPD have been well documented in the literature (DoE 2008; Singh & Stoloff 2007; Uzunboyly 2007; Delfino & Persico 2006), however void in the literature is a systematic examination of the individuals who deliver the instruction. Gilly Salmon, one of the pioneers of online facilitation has published numerous books and articles documenting the need for facilitators to be trained specifically to deliver OTPD (Salmon, 2000; 2002; 2003) yet none of these studies has presented an examination of a program designed to meet that need.

Institutions and organizations remain hesitant of adopting online learning programs partly due to the lack of research measuring the effectiveness and rigor of such courses and the barriers that have deterred participants from enrolling in OTPD programs (Ebersole, 2007; Appana, 2008). One of the most commonly noted barriers has been participants' concerns of isolation and fear of little or no support from the facilitator (Muilenburg & Berge, 2005). The lack of physical presence of a facilitator makes the need for their training more significant. In a virtual environment the OTPD facilitator must work to make all participants feel comfortable while providing learner-centered, self-directed, challenging, and scaffolded learning by employing differentiated instruction and appropriately utilizing emerging technologies (Holt & Thompson, 1998).

If success in a program designed to train facilitators to effectively deliver OTPD is shown to be positively related to participant success in teacher training and subsequent student achievement, it could help increase the credibility of OTPD and transform the future of TPD through OTPD training. Results of this study could contribute to the promotion of OTPD implementation as well as add to the currently sparse literature in this area and promote future research of OTPD facilitator training. It will further provide a model by which other OPD programs can measure training effectiveness.

The research presented in this dissertation examined, through a systematic evaluation, whether self reported success and satisfaction with an OTPD facilitator-training course is related to teacher and student outcomes of interest. While this study is limited in that it does not purport to present experimental evidence of facilitator training effectiveness, it will contribute to the literature in an aspect of this field where current evaluation is lacking. Further limitations of the study include issues with generalizability in that a convenience sample has been used, comprised of facilitators who self selected into a single training program and delivered OTPD to participants who self selected into one of 70 courses in a single OTPD program.

The initial chapter of this study explains the study background, states the problem and purpose, outlines the research questions, gives an overview of the methodology, and describes its professional significance. Finally, the chapter defines pertinent terms, outlines limitations and delimitations of the study, and summarizes the implications sought.

Background

TPD is an important and necessary component of pre- and in-service teacher training. Research literature has shown that it positively affects teacher learning and classroom implementation, making it important to student achievement (DoE, 2008; Singh & Stoloff, 2007; Uzunboylu, 2007; Rhodes et al., 2004; Yoon et al., 2007). The federal government has also recognized the importance of TPD in the most recent reauthorization of the *Elementary and Secondary Education Act*, No Child Left Behind.

Teachers are challenged to respond to evolving educational reform while also providing meaningful education to an increasingly diverse student population. In the 2007-2008 academic year, Title II of NCLB allocated \$2.77 billion across the United States for teacher quality reform. Between the 2002-2003 school year and the 2007-2008 school year, funds distributed to school districts that were then allocated to TPD increased from 27% to 50% (Department of Education 2008).

While Title II funds are aimed at promoting flexibility in district spending for TPD, the programs selected are often deemed to be of low value as quality control mechanisms do not exist (Sawchuk, 2008). The TPD that districts are offering is traditionally one day, single session courses selected by the administration (Colbert, Brown, Choi, & Thomas, 2008; North Central Regional Education Laboratory, 2004; Sparks & Loucks-Horsley, 1989). One day TPD selected in a top-down manner has been shown to have adverse effects on teacher buy-in. These findings are daunting, as teacher buy-in has been shown in the literature to be a characteristic that has been proven necessary for TPD effectiveness (Holmes Group, 1990; Sparks, 1997).

Teachers reject traditional one day TPD, because it takes time away from teaching or mandates teachers' after school attendance, which may interfere with tutoring students, personal commitments or may even violate teacher contracts (Fine, 1994; Abdal-Haqq, 1996). It also locks teachers in to the particular aspect of teacher training chosen by their school. Teachers are not given a choice of TPD topics, therefore training cannot be individualized to their particular content area or pedagogy needs (Rhodes, 2004; Darling-Hammond, 2000).

Individualized, ongoing teacher training on the other hand, benefits teachers and students in that it provides training in an area selected by the teachers, which allows them to delve deeper into specific aspects of their teaching area or in which they feel they need more knowledge or understanding. It further allows teachers to develop a community of learners over time (Cosner & Petereson, 2003; Roger & Latchem, 2004).

The most effective TPD is that which teachers are involved in selecting, planning, setting goals for, and that is delivered through differentiated instruction (Holmes Group, 1990). Programs with such features however, if delivered face-to-face, generally require more resources than one-day seminars. Transferring TPD to an online environment can provide solutions to the challenges posed by the implementation of traditional face-to-face TPD, such as time, financial resources, geography, and content individualization (Appana, 2006; Atkinson & O'Connor, 2007).

Time has emerged as a primary issue in promoting school policy change, including expanding TPD efforts. Research has suggested the use of technology to deliver TPD can be an effective use of teachers' TPD time. One of the primary benefits of OTPD is that it affords teachers and administrators "anywhere, anytime" learning

which allows for participation in TPD training at a time that works best in their personal schedule (Appana, 2006). In addition, technology can serve as a means to build learning communities and gain access to a wide range of instructional resources via electronic mail and course management sites (Ryan, 2001; Knightley, 2007; Clark, 2004; Blair & Monske, 2003). The use of OTPD also allows teachers who live in rural and remote areas to gain access to the same high quality training received by teachers who live in more urban areas where TPD is more readily accessible (Zabala, 2003). A school's participation in an OTPD program also permits teacher selection of the content area that most closely aligns with his or her needs. OTPD frees teachers from the constraints of attending the course selected for them by their school or district and allows them to choose a course specific to their discipline.

Program cost effectiveness has also emerged in the research literature as an advantage of online learning. While the start-up costs of online programs are greater than those of face-to-face courses, the theory of economy of scale indicates that these costs are justified by long-term economic effectiveness (Curran, 2001; Littlejohn, 2003).

Previous literature indicates that the adoption of OTPD programs will allow more teachers and administrators access to high quality, individualized TPD at a time and location that is most convenient for the participants' schedule and geographical location, while also allowing for program cost effectiveness as a result of the economic scale.

Research has found that drawbacks to online learning do exist. Aside from expensive start-up costs, online learning can also lend itself to a sense of learner isolation from both the course facilitator and the other learners participating in the course (Sun et al., 2008). Online learners can also be weary of technology, impeding on their ability to

participate fully due to computer anxiety or lack of experience (Smart & Cappell, 2006). OTPD courses further require a need for greater discipline and self-motivation (Ryan, 2001; Picciano, 2002).

Literature calling into question the rigor of online learning exists in the field as well. Too few controlled studies measuring either the differences in learner achievement of online versus face-to-face learning or the quality of OTPD facilitation have been conducted to adequately draw conclusions about the rigor of OTPD.

The primary challenge for today's educational leaders is to integrate the research outlining best practices for facilitating online learning with that of quality TPD in order to fully maximize technological advances and to support the continued growth and success of OTPD. Successful online learners are typically motivated by internal, as opposed to external factors. Research literature has shown that adult learners are typically internally motivated learners, making the teacher population an excellent demographic for online learning. The potential, therefore, for sound online delivery to allow teachers from rural, underserved institutions to receive the same high quality TPD as those from wealthier, more central schools does exist. Chris Dede, a noted scholar in educational technology has remarked, "applying more effective methods of OTPD implementation is key to helping our society to a brighter future" (Dede, as cited in Atkinson & O'Connor, 2006).

Statement of the Problem

There is a growing body of research that supports the effectiveness of online learning, as well as literature that calls into question the rigor of the delivery and successfulness of such training. Lacking in the literature is a systematic evaluation of the

effectiveness of a training course designed to instruct individuals to deliver OTPD to teachers, and its impact on teacher learning and student achievement.

As a result of the recent and dramatic expansion of online learning, little time has been, or is currently being, dedicated to examining the training being provided to OTPD facilitators to ensure that these individuals are being trained to effectively deliver OTPD *specifically* in an online format.

OTPD facilitation requires not only the mastery of specific instructional practices but also the exemplary management of a responsive online learning environment. Such an environment alleviates communication anxiety allowing participants to be active learners. Facilitators are challenged also with providing participants with differentiated learning activities that are aligned with their personal and professional needs, and will create a dynamic balance among managing learning, promoting self-directed learning, and the formation of learning communities (Durrington et al., 2006; Taylor & Smith 2005).

The skills and best practices for training online do not parallel those necessary for delivering face-to-face training. Research has shown that merely mimicking face-to-face TPD in a virtual platform does not guarantee an effective TPD experience (Levenburg & Major, 2000). The training provided to OTPD facilitators should be dedicated specifically to developing expertise in those techniques (Carter, 2004; Singh et al., 2007; Githens, 2007; Singer, 2008; Zygouris, 1997). Further, the training should occur online allowing facilitators to gain experience in the same setting in which they will be delivering TPD in order to experience first hand the challenges or frustrations their participants may face.

Extensive studies have been done describing indicators of successful TPD. Such factors include: teacher ratings of the course quality, classroom implementation of TPD content, student impacts, and interest in continued training (Gaskill & Treacy, 2006). Research literature has shown that if facilitators of an OTPD course are not properly trained, successful TPD will not be realized. Ensuring that OTPD courses are lead by a trained facilitator working with a high quality online instructional design has been shown to be related to a increased likelihood that online learners will be successful in their program (Joiner, 2002; Palloff & Pratt, 1999).

The need to ensure that OTPD is of high quality is not new to the field. Rather in 2001 the National Staff Development Council and the National Institute for Community Innovations collaborated to review the National Staff Development Council's Standards for Staff Development. This review resulted in the development of standards that have been accepted as guidelines for OTPD. The standards outline where learning occurs, how learning occurs, and what learning occurs.

Specialized resources needed to employ high quality TPD are outlined as a function of these standards. One of the three primary resources delineated is specialized human support. Such support includes individuals trained in designing and facilitating OTPD.

The issue remains, however, that well-meaning facilitators intending to provide exemplary TPD to teachers in an online environment are often ill equipped to do so and are therefore offering sub-par OTPD delivery (Salmon, 2003, p. 80). As a result teachers are receiving ineffective TPD. If findings from the present study show that successful online training of facilitators is positively related to: high ratings of TPD quality,

increased likelihood that the TPD material will be implemented in the classroom, increased likelihood that the teacher will take a future OTPD course, and high teacher reported ratings of student achievement, it could have a positive impact on the future of teacher TPD reform.

The problem that this research was framed around, therefore, is: Although OPD is being shown to be an effective means of delivering TPD to pre- and in-service teachers, too few facilitators are being trained specifically to deliver OTPD and are therefore ill-equipped to deliver high quality OTPD. Facilitators who are trained specifically to deliver instruction in an online format will be better prepared to teach online and will therefore elicit higher course quality ratings from participants.

Purpose and Objectives of the Study

Although online learning has emerged as a feasible alternative to traditional face-to-face TPD, its very recent and dramatic development has allowed for little research to be done examining the effectiveness of OTPD facilitators. Research surrounding OTPD has generally focused on issues such as: teacher community formation, teachers' experience with technology, online discourse patterns, the creation of resource sharing for teachers, and whether teachers use the material in the classroom (Bautista, 1998; Hammond, 1998; Corcoran, 1995). Lacking in the literature, however, is an examination of the training received by facilitators and whether it is related to successful TPD delivery; this research expects to help fill that void.

The definition of "successful TPD" varies in the literature. Based on a review of the current literature, successful TPD was defined in this study as *TPD that garners high course quality ratings, an increased likelihood of implementation of TPD material in the*

classroom, high teacher reported student outcomes in the classroom after implementing the material, increased likelihood of completing the TPD course, and increased likelihood of enrolling in a future TPD course.

The purpose of this study, therefore, was to establish evidence that successfully training facilitators to deliver TPD online is related to teacher and student outcomes of interest by demonstrating a relationship between the effectiveness of such training and: (1) teachers' perception of OTPD following course completion, likelihood to use the TPD in their classroom, and/or reported student achievement; (2) teachers' OTPD course completion; and (3) teachers' likelihood to enroll in a future OTPD course.

Researchers have encountered a number of obstacles when attempting to conduct evaluations of online learning programs. Few organizations have developed and implemented an online training program designed specifically to prepare facilitators to deliver OTPD to teachers and used quantitative data to determine the net effects of the training program when random assignment is not possible (U.S DoE, 2008). This study attempted to meet those challenges by conducting exploratory research on a single online facilitator-training program developed by the Educational Development Center (EDC). The program has been designed to address the issues raised in the research about effective facilitator training. This training is offered as one part of a larger OTPD initiative.

eLearning for Educators (eFE) is an eight state online professional development initiative designed to build state's capacity to deliver high-quality OPD to teachers, especially to those in schools identified as "high-need." Grant funding for the initiative was secured late in 2005 through the DOE "Ready-to-Teach" grant and dissemination of

funds began in early 2006. The states involved in the initiative at the time of the data collection were: Alabama, Delaware, Kentucky, Mississippi, Missouri, New Hampshire, Pennsylvania, and West Virginia. The eFE initiative combines the expertise of the EDC, Alabama Public Television (APTV), and Boston College's inTASC and CSTEED teams, to offer OTPD teacher courses and facilitator and course developer training, in an effort to help states build their own capacity to organize, plan, develop, and provide high-quality OTPD courses.

The EDC developed *Facilitating and Implementing Online Professional Development* course prepares individuals from various educational organizations and departments to facilitate online courses for colleagues in their states or school districts. Individuals have reported through survey data that the training they received in the online environment allowed them to experience online teaching and learning first as learners and then as facilitators, gaining valuable experience necessary to build strong local OTPD programs. The facilitator training course focuses on: online teaching and learning, skills and techniques of online facilitators, planning for incorporating online learning into local programs, and specific preparation to facilitate an online course.

The EDC online facilitator-training program was examined to determine the relationship between facilitator self-reported ratings of training program effectiveness and teacher and student outcomes of interest. While the results from this study do not allow for broad generalizability, the findings will nevertheless allow for a unique contribution to the literature in an area that is currently void. The findings will provide evidence as to whether effective online facilitator training focused on delivering OTPD is an indicator of teachers': course quality ratings; perceptions of TPD; likelihood of course

completion; likelihood to take another OTPD course; implementation of course content in the classroom; and teacher reported student impacts in the classroom.

NCLB has made having a highly qualified teacher in every classroom an important and well-funded school reform initiative with a great deal of promise for positively affecting student achievement. Time and budget constraints have made bringing high quality TPD to all teachers a primary concern in many school districts. OTPD is an alternative to traditional face-to-face TPD that can make continued, cost effective and content-specific TPD accessible to an ever-growing number of teachers. Ensuring that the delivery of the OTPD is rigorous and effective can achieve the goal of positively impacting teacher learning and student achievement as well as increase the likelihood that a teacher will make TPD an ongoing part of his or her career by continuing to enroll in OTPD courses while making professional development more cost effective for schools and districts. To that end, the instructors training the teachers must be skilled in effectively delivering learning online.

The purpose of this study has been to research the current literature in this field, develop an analysis to measure the relationship between facilitator self-reported ratings of training effectiveness and teacher and student outcomes of interest. The central research hypothesis is that there is a positive relationship between success in the EDC developed facilitator training course and teacher ratings of the training and of their students' subsequent achievement.

Target Audience

The target audience of this study is school administrators, teachers, educational policy makers, educational researchers, and OPD program directors. Administrators who

are interested in moving away from the traditional top-down TPD toward training that has been proven more effective while remaining within district TPD budget constraints will benefit from this research. Further, teachers who may be weary of feelings of isolation in an OTPD course will find this research useful, as they will be confident that course facilitators who are well trained will successfully assist participants fearful of online environments. In addition, educational policy makers who may be interested in placing more stringent stipulations on the use of Title II funds, and educational researchers who are interested in conducting future research on OTPD facilitation and facilitator training will benefit from this study.

The research presented here is also intended for directors of OTPD programs that do not currently include a facilitator-training component. Finally, the study is intended for directors of OTPD programs that do include a facilitator training program and are interested in understanding the facets of the program that are shown to most significantly impact teacher outcomes. The model presented here will be able to be replicated in other OPD programs to measure such impacts.

Research Questions

This study was designed to explore whether facilitator self-reported achievement in an online training course are significantly related to teacher outcomes of interest in order to lay a foundation for further studies in the area of OPD facilitator training. The five questions used to explore possible relationships follow:

1. Are there facilitator training features or facilitator characteristics that can predict teacher ratings of an OTPD course?
2. Are there facilitator training features or facilitator characteristics that can

predict teacher reported student achievement in the classroom?

3. Is the achievement facilitators report in their training course related to whether or not teachers complete their OTPD course?

4. Is the achievement facilitators report in a training course related to whether or not teachers implement the TPD content in their classroom?

5. Is the achievement facilitators report in a training course related to whether or not teachers enroll in a future OTPD course?

Importance of the Study

The exploration of these questions is important because little research has been done examining how facilitators are trained to deliver OTPD. This void is due, in great part, to the recent and rapid growth of OTPD. Although online training is expanding rapidly, evaluation of its implementation and outcomes is necessary. By systematically examining this issue, the results from this study draw attention to the importance of examining facilitator training to deliver instruction online and will therefore fill that void.

The findings from this study can affect the future of TPD instruction in a number of ways. Currently the majority of OTPD programs available to teachers do not require their facilitators to be trained specifically to deliver OTPD. If a positive relationship is established between the facilitator-training course and teacher and student outcomes of interest, it will support the adoption of such training programs and possibly increase the credibility of OTPD courses.

Establishing the credibility of instruction teachers are receiving in OTPD courses will not only promote its adoption in school districts throughout the country, but effective

facilitation will curb teachers' fears of isolation and facilitator separation. These changes will benefit the training of pre- and in-service teachers. Increased OTPD offerings and enrollment will allow for teacher choice of TPD content, a better use of district's financial resources, teacher schedule flexibility, and the promotion of ongoing training as opposed to one-day seminars.

These study findings may further promote future research in this area. As this is an exploratory study, the goal is to examine the data for emergent trends indicating relationships between online facilitator training and successful teacher TPD to identify possible areas for future concentrated and controlled studies.

Definitions

The following definitions are intended to clarify the meaning of common terms used in this study.

Professional development – Learning opportunities that engage educators' creative and reflective capacities in ways that strengthen their practice (Bredson, 2003).

eLearning – A formal learning activity, which occurs when learners and facilitators are separated by geographic distance. It is instruction delivered in a web-based format implemented through self-paced independent study units, asynchronous interactive sessions, or synchronous sessions (Smart & Cappel, 2006; Ryan, 2001; Knightley, 2007; Bartley & Golek, 2004).

Facilitator – One that helps to bring about an outcome (as learning, productivity, or communication) by providing indirect or unobtrusive assistance, guidance, or supervision. Used interchangeably in the literature with tutor, instructor, and moderator.

Online facilitation – Bringing about an outcome by providing indirect or unobtrusive assistance when the physical nature of a classroom is removed.

Participant – A teacher who has enrolled in an EDC developed online professional development course.

Student – An individual in a K-12 class taught by one of the study participants.

Completer – A participant who completed the course post-survey

Non-completer – A participant who completed only the course pre-survey

Implementer – A participant who indicated having implemented the learned TPD content in his or her classroom within six months of completing the course.

Non-implementer – A participant who indicated that he or she had not implemented the learned TPD content in the classroom within six months after completing the course.

Returning user – A participants who enrolled in another EDC developed or state developed OTPD course within 12 months of course completion.

One-time user – A participant who did not enroll in another EDC developed OTPD course within 12 months of course completion

Limitations

This study used data collected from facilitators and participants who self-selected into either the EDC developed facilitator-training course or an EDC developed professional development course. Completion of both the pre- and post-survey were mandatory to receive credit for having taken the course. Data collection in the program is ongoing, however the data used in this study were collected between June 2006 and June 2008. A random sample of participants was selected to complete a six-month out follow up survey. The implementation and student achievement analyses are based on this

follow-up survey and are, therefore, based on a much smaller sample (13% of the total sample) than the other three analyses. This smaller group further limits the generalizability of these findings.

In addition, some of the eight states combined sections of their online facilitator training with a face-to-face component. As this research seeks to examine the impact of strictly online facilitator training, those facilitators who took part in a face-to-face component were removed from the sample. Finally, course offerings vary across participants, as do the experience levels and background characteristics of teachers and facilitators. Every effort was taken in the statistical design to account for these differences.

Summary

The dissertation proposed recognizes the problem of too few facilitators being trained specifically to deliver OPD; in response, a method for examining the issue by reviewing the literature was developed. The proposal presents the importance of professional development as well as the emergence of OTPD. It explores the history of eLearning and its impact on education. The advantages, disadvantages, and challenges of delivering online instruction are explored as well. Literature that emphasized the difference between instructing in a face-to-face PD environment and an online PD environment will be presented, as well as literature that indicated the importance of learning to train specifically online. The review of the literature will conclude with a look at attempts to define facilitator satisfaction and teacher success in a professional development course. Based upon the information reported, the study will then attempt to explore questions about whether or not a relationship existed between facilitator ratings

of training course effectiveness and teacher outcomes of interest. The study ultimately seeks to find factors associated with the online facilitator-training course that could account for recognizable differences in teacher and student outcomes of interest. The results are intended to inform OTPD processes as well as teacher retention and content implementation.

This chapter introduced the reader to growing adoption of OTPD for teachers at the K-12 level. The study's efforts to inform and improve practices in OTPD facilitation and the professional significance of attention to equity of access to high quality and well-delivered OTPD were discussed. Key terms in the study were defined and limitations created by the study design were delimited and an overview of the remaining chapters was presented.

Chapter 2 reviews current literature addressing TPD, online learning, OTPD and facilitation of OTPD courses. Chapter 3 outlines the method employed within the study including the explanation of the sample, development and psychometric properties of the instrumentation, data gathering and data analysis. Chapter 4 presents the data analysis and the results by hypothesis. Chapter 5 concludes with a discussion of the findings and implications for further studies.

Chapter 2

REVIEW OF THE LITERATURE

In Chapter 1 evidence of Teacher Professional Development (TPD) as an important and necessary component of a teacher's career was briefly discussed. The federally mandated *No Child Left Behind Act* recognizes TPD's significance and provides funding to schools across the nation for teacher training. Even with Title II funds districts are finding it challenging to provide individualized, high quality TPD to all teachers. Chapter 1 discussed Online Teacher Professional Development (OTPD) as quickly becoming an effective and viable alternative to traditional face-to-face TPD. This new form of teacher training has not yet been rigorously researched and while there is a great deal of research literature discussing the importance of OTPD facilitator training, currently void in the research is any examination of OTPD facilitator training effectiveness.

In order to develop a theoretical framework for this dissertation, an extensive review of the literature was conducted to uncover the most current and pertinent research in the field. This chapter synthesizes the literature related to effective TPD, OTPD, online facilitation, and research on the importance of training to facilitate online. While the review uncovered a limited number of relevant empirical studies, those found were included. The majority of the literature primarily examined, however, included works generally based on case studies, anecdotal studies, and meta-analyses of empirical research and case studies.

Methods

To retrieve relevant studies to be included in this literature review electronic journal databases as well as published books were searched. The primary electronic database searched was the Educational Resource Information Center (ERIC). Education Research Complete and the Google Scholar were searched as well. Literature was reviewed only if published within the last 20 years (exceptions included primary sources providing information on historical content). A great deal of the research literature included in this review was identified through the bibliographic references of individual studies and literature reviews. Finally, interviews with OTPD program directors and direct contact with OTPD experts revealed a number of useful sources as well.

After an extensive review of the literature, research on the effects of OTPD training programs was not found. Thus in order to develop a basis for this research the review of the literature was broadened. Search terms included: professional development, teacher professional development, distance education, eLearning, online learning, online professional development, facilitation, professional development facilitation and online facilitation with key words such as evaluation, research, advantages, disadvantages, and impact. The search process yielded a great deal of anecdotal research and case studies. Several relevant research reviews and syntheses of online professional development literature were examined, as were some individual research studies.

In addition to being published within the past twenty years, to be included in the current review, studies had to meet the following criteria:

(1) Professional development studies reviewed had to be directed toward educators in grades K-12. For general PD research, the courses could operate as a one-day course, an

ongoing course, or a cluster of courses. The PD examined could be delivered in a face-to-face or online format, although the majority of studies examined face-to-face PD.

(2) Online learning studies reviewed had to be focused on eLearning as previously defined rather than distance education. Facilitator and participant had to be separated by time and geography and use the Internet to communicate. Exceptions included literature developing a historical context for eLearning.

(3) Research on the advantages and disadvantages of facilitating online versus facilitating in a face-to-face environment could be specifically focused on PD courses or could be studies of general facilitation techniques.

After a preliminary examination of all documents retrieved, ATLAS, a qualitative software package, was used to code all relevant and pertinent studies. A qualitative analysis was conducted on the codes to determine emergent themes in each component of the theoretical framework. If a strand was found to be inappropriate, or did not strengthen the basis for this research it was removed from the review. This was an iterative process conducted until a solid theoretical framework was established and saturation in the codes was reached for each of the major themes of the framework.

Theoretical Framework

The theoretical framework of this research is grounded in the following major themes: (a) existing literature on high quality TPD; (b) the evolution of distance education, online learning and OTPD; (c) the debate in the research about the advantages of OTPD; (d) the fundamental difference between facilitating OTPD and facilitating face-to-face TPD; (e) existing literature on the importance of training to facilitate online; (f) policy implications of OTPD; and (g) methods used for determining outcomes of a

facilitator training program. The theoretical framework seeks to answer the following questions: *What do we already know about high quality TPD, OTPD, facilitating an OTPD course, the need for OTPD facilitator training, and policy issues surrounding OTPD? What is absent in the literature? How should this void be addressed?*

In order to answer these questions, this chapter has been organized into eight sections. The introduction of the literature reviewed presents a synthesis of the available literature in the field. The second section of the review presents the relevant literature on, and defines, teacher professional development, as well as outlines the commonly accepted features associated with high quality TPD. The section also introduces the research literature on OTPD. The third section presents the history of distance education and the evolution of eLearning. This section also discusses OTPD as an alternative to face-to-face TPD. Section four focuses on the debate in the literature about the advantages and disadvantages of online learning with a specific focus on OTPD. The fifth section outlines the major differences in skills and best practices associated with facilitating online courses and those pertinent to face-to-face facilitation. Section six discusses the importance of training individuals to facilitate in an online environment and the implications of facilitators not receiving such training. The seventh section of the review discusses policy concerns surrounding TPD. The eighth and final section of this review examines prior studies that have attempted to measure OTPD facilitator training effectiveness and the methods used in such studies. The goal of this review was to establish a basis for the need to research the effects of an OTPD facilitator training program.

Introduction

Administrators and policy makers are faced with growing needs and shrinking resources to meet those needs. A number of recent publications speak to those needs. Colbert et al. (2008), Dede, Ketelhut, Whitehouse, Breit, & McCloskey (2008), and Fullan (2007) note that teachers are challenged with adhering to ever-changing policy demands, meeting the needs of an increasingly diverse student body, and remaining on the cusp of cutting edge teaching strategies. Desimone et al. (2006), Fullan & Miles (1992), Borko (2004), Cohen (2000), Colbert (2008), Corcoran (1995), Hill (2004), and Darling-Hammond (2000) all echo these sentiments and agree that administrators, policy makers, and teachers must constantly seek opportunity to maximize fiscal, physical, and human assets while maintaining a focus on teacher learning and ultimately increased student achievement.

It is commonly accepted in the field that the single most important variable in schools affecting student achievement is teacher quality. Further, as the nation becomes more entrenched in meeting high standards and accountability, the academic achievements expected of students are increasing dramatically. As the strong positive relationship between TPD and student achievement is not debated in the research literature, at the forefront of school and district budgeting concerns should be high-quality, continued teacher professional development (Yoon et al., 2007; Holmes Group, 1995; Darling-Hammond, 2000; Rivkin, Hanushek, & Kain, 2005; UNESCO, 2006, NCLB, 2002).

Bartolic-Zlomislic (1999) remarked that virtual delivery of TPD instruction offers the opportunity to reach remote areas and audiences of varying sizes with the same

quality of delivered instruction. Two years later Farrell (2001) echoed these contentions when he stated that rapid technological innovations offer the potential to stretch resources over distances, provide previously unattainable resources, and establish a platform for future innovations. Most recently Lowery (2008) built on the previous research on OTPD when he remarked that if utilized properly, technology in TPD has the opportunity to narrow educational gaps and promote equity in education.

It is important that teachers, administrators, policy makers and educational researchers to work together to promote the effective use of technology to ensure high-quality TPD is delivered to all teachers regardless of time or geographical constraints. Robinson (2008) agreed with the research of Bartolic-Zlomislic (1999), Farrell (2001) and, Lowery (2008). In a 2008 case study of an OTPD program in rural Western China, Robinson sought to determine whether OTPD would allow teachers in a rural, underserved area to receive the same high quality TPD that teachers in more urban areas were offered. She concluded that educational technology can promote equity in education. She stated:

The use of distance education and ICT [information communication technology] has the potential to distribute opportunities for learning more widely and equitably across the teaching force. It can also improve the quality and variety of the resources and support available to teachers, opening up new avenues to professional development.

The National Staff Development Council (NSDC) (2001) stated that OTPD programs hold promise for the future of teacher learning and student achievement. The Southern Regional Education Board (SREB) (2001), recognizing the rapid movement toward OTPD, published standards for developing, implementing, and evaluating OTPD.

The Board combined the NSDC's standards for staff development with proven methods for effective online learning to construct a document aimed at ensuring high quality OTPD is delivered to all teachers.

Weiss (2006) indicated that over the past 12 years educational leaders have watched as technology in education has changed the face of the traditional classroom. Vanides (2007) concluded from his research on effective OTPD that technology, if implemented properly, can significantly alter TPD and the movement toward all educators being considered "high quality". eLearning and TPD researchers agree that OTPD is emerging as a viable alternative to the traditional one-day face-to-face seminars generally delivered in school districts (Singh et al., 2007; Robinson & Latchem, 2003; Pape, 2004; Lowry, 2008; Fullan, 2007).

Teacher Professional Development

Hundreds of studies have been done in the past decade on the importance of pre- and in-service TPD in an effort to understand the significance of promoting teachers as professionals and increasing student achievement (Cohen et al., 2000; Cohen et al., 2002; Colbert et al., 2008; Desimone, 2006). The primary emergent theme in teacher professional development literature is that the ultimate goal of TPD, regardless of the form of delivery, is increased student achievement. At the core of all TPD research literature is the understanding that without meaningful teacher professional development notable improvements in education will not be realized (Guskey, 2007; Fullan, 1999; Sparks & Richardson, 1997). In 1996 the Commission on Teaching and America's Future concluded that when teachers are exposed to exemplary TPD that is results-driven

and individualized to teacher needs, student academic achievement is realized (NCTAF, 1996).

While TPD, in general, assumes various definitions in the literature, Hill (2004) and Smith, et al. (2006) provide the most common definition of TPD which focuses on TPD programs being made up of a series of activities intended to increase the skills, knowledge or understanding of teachers and their effectiveness in schools. TPD is seen to create effective educational organizations and raise the standard of learner achievement, however little empirical research has been conducted examining such effects (Borko 2004; Clewell, Campbell, and Perlman 2004; Kennedy 1998; Richardson and Placier 2001; Supovitz 2001; Yoon, Duncan, Lee, Scarloss, and Shapley 2007). What the generally subjective studies found in the literature have concluded is that TPD is a common and necessary approach to improving teacher quality (Darling-Hammond, 1998; Geringer, 2003; Colbert et al., 2008). Yoon, et al. (2007) conducted a review of empirical research of controlled studies focused on the relationship between TPD and student achievement. Six studies were included in the review and of these, three studies showed positive and statistically significant impacts on student achievement. Insufficient variation, however, did not allow for the researchers to draw conclusions about the most effective characteristics of TPD.

A controlled study conducted by Desimone, Smith, and Ueno (2006) found that teachers holding a certificate in their area of teaching was not significantly related to an increased emphasis on conceptual teaching goals. Teachers who indicated having participated in TPD activities, however, were found to be statistically significantly more likely to emphasize conceptual learning goals and conceptual learning strategies.

Before any effect can be seen as a result of TPD, however, teachers must be open to development. Rhodes, et al. (2004) indicated that success and effectiveness of any type of teacher professional development program depends partially on the buy-in from teacher participants. Results from this study indicated that if teachers believe that TPD is being done to them rather than for them, they are less likely to benefit from the training being offered. Supovitz and Turner (2000) mimicked such findings when they indicated that if the TPD offered is not teacher centered, but rather directed at teachers, they would be less likely to benefit from the training. Darling-Hammond (2000) remarked that too often TPD is viewed as being fragmented, attended by teachers only because it is a requirement, and relatively superficial. Such training is not met with teacher acceptance. Rhodes, et al. (2004) further noted that teachers in their study had indicated that professional development often ignites feelings of top-down direction, and would be accepted more openly should the training be individualized, needs-based, and teacher-centered.

The traditional model for TPD, however, has been shown as often failing to deliver such training, for a myriad of reasons. There is a prescribed formula that TPD often follows. Rhodes, Stokes, & Hampton (2004), Supovitz (2000) and Little (1994) have described this type of TPD as one in-service session, the topic of which is selected by the administration. Smith and Trayner (2006) noted that this model is expensive and does not directly address all teachers' needs, often making them a waste of time and money that turns teachers off and has not been shown to result in beneficial TPD. The Holmes Group research on teacher training shows similar findings (Holmes Group, 1991; Holmes Group, 1995).

Effective TPD has been shown, in the literature, to be made up of training that is ongoing, reflective, supports the construction of a professional learning community, is based in classroom practice, and grounded in current research. Additionally, Sparks (2002) remarked that TPD should be tailored to teachers' specific needs and embedded in their daily lives. Further, they argued that such TPD should come with strong support from the teacher's administration. One-day TPD sessions often do not afford such capabilities as they deliver general, broad topics on teaching that do not offer teachers content specific training. Should administrators attempt to transform face-to-face TPD into a model of individualized, reflective, ongoing TPD it would prove prohibitively costly and would most likely interfere with teachers' schedules.

History of Distance Education and eLearning

In the past decade OTPD has emerged as an alternative to traditional face-to-face TPD. The concept of employing distance education to break down learning barriers is not new to education, rather it has been available since long before communications technologies were widespread, and therefore the definition of 'distance learning' has evolved over many years (Keegan, 1996; Nipper, 1989).

Distance education is currently understood to mean a formal learning activity that occurs when students and instructors are separated by geographic distance or by time (Banathy 1994; Hannum & Briggs 1982; Olugbenga & Olakulehin 2006; Bloomeyer, 2002). Vonderwell (2004) described distance education as "[a function that] enables groups that are separated by time and space to engage in the active production of shared knowledge." An analysis of various definitions shows a common theme. The separation of teacher and learner is central to every definition of distance education (Smart &

Cappel, 2006; Ryan, 2001; Knightley, 2007; Bartley & Golek, 2004; Keegan, 1996). The level of separation between learner and instructor, however, varies depending on the type of institution, platform of delivery, and the generation during which the definition was constructed.

The history of education has observed paradigmatic shifts as a result of technology. Technology has allowed communication between information sender and information receiver to span great distances. Electronic technology, however, has not always been a requirement of distance education. Nipper (1989) developed three distinct models of distance education and linked each to the historical development of various technologies; he referred to these three models as “distance education generations.” At its origin, distance education was grounded in paper correspondence. Nipper (1989) referred to the age of correspondence education as the “first generation.”

Although correspondence study is largely recognized as being developed in 1873 by Anna Ticknor, an educator who created a society aimed at encouraging at home studies for women, it was between 1883 and 1891 that the first official recognition of education by correspondence came from Chautauqua College of Liberal Arts (Ticknor, 1891; Watkins, 1991). In 1915 The National University Extension Association was created to develop policy surrounding correspondence standards and credit acceptance. It was at this point that institutions of higher education began to accept correspondence education as mainstream (Watkins, 1991). Correspondence study, as a form of distance education, comprised students being delivered extensive documents, either written or printed, and communicating with their teacher at a very slow pace. New technologies such as printing machines made this first generation feasible (Nipper, 1989).

When radio, lantern-slides, and motion pictures were invented, they changed the dynamic of distance education. These innovations, combined with advancements such as radio and television broadcast, and telephone conversations between instructors and students defined Nipper's "second generation" between 1918 and 1946 (Nipper, 1989). Atkins (1991) remarked that between the World Wars the government began granting broadcasting licenses to colleges and universities, and although this helped distance education become more widespread, by the mid-twentieth century it remained scarcely accepted as high quality (Wright, 1991). The hesitancy to recognize distance education as effective was due, in part, to the lack of research surrounding its effects. It was at this point that researchers began conducting studies in an attempt to answer questions such as, what is the difference between face-to-face learning and correspondence education?

Technological communication was not introduced into the working definition of distance learning until Nipper's "third generation" which began in the 1970's (Nipper, 1989). Distance education, as defined in the third generation included some form of mechanical or electronic communication, which replaced interpersonal relations. It was at this point that regular facilitator-student interaction was common as well as frequent student-student interaction, and a working definition of eLearning was established (Keegan, 1996). Following Nippers three defined generations, Taylor (2001) expanded on the timeline by including a fourth generation identified by "anytime, any place learning" based on Internet delivery. Then a fifth generation constructed around eLearning was developed. This learning was identified as that which began with the facilitator being responsible for learning and as the course progressed, responsibility being transferred from facilitator to learner control.

Finally, in the early 21st Century eLearning emerged as distinct from distance education. The explosion of media rich Internet content had made widespread eLearning an affordable and accessible option. Bloomeyer (2002) noted that the promoted use of eLearning for training both on college campuses and in industry made it necessary to revise the learned definition of distance education. Smart & Cappel (2006) note that eLearning became known as instruction that was delivered electronically via the Internet, intranet, or multimedia platforms.

The expression eLearning is synonymous in the literature with terms such as: web-based learning and online learning. These terms are often used interchangeably in the research (Smart & Cappel, 2006; Brown, 1996; Hara & Kling, 2000; Ryan, 2001). Pei-Chen Sun and Ray J. Tsai (2008) in their empirical study on factors influencing learner satisfaction in an online environment clarified the definition concluding eLearning is: “the use of telecommunication technology to deliver information for educators and training. It is a web-based system that makes information or knowledge available to users or learners and disregards time restrictions or geographical proximity”.

The present study defined eLearning using a synthesis of the definitions in current research from the years 2007 and 2008. The definition used in this study is: *learning that is a formal activity supported by information communication technology and delivered through the internet for educators; it is also training which occurs when facilitators and participants are separated by geographic distance or by time* (Sun et. al, 2008; Knightley, 2007; Gaytan et al., 2007; Delfino et al., 2007).

About a decade ago, educational policy makers and TPD program directors began utilizing the online learning models previously developed to bring TPD to teachers

without the constraints of time or geography. As noted in the previous section, Fullan (1999), Sparks (2002) and Reed (2005) have all remarked that high quality TPD requires: teacher buy-in, teachers autonomy in selecting TPD topics, teacher self-instruction, focused and ongoing feedback, and intense courses with long-term context. Darling-Hammond (2000) and Supovitz (2002) have further indicated that effective TPD is based in classroom practice, grounded in current research and reflective. Cosner (2003) contends that the development of a professional community of learners is further necessary for quality teacher training. The introduction of OTPD afforded educators access to each of these indicators of high-quality TPD while providing them, and program directors, with additional benefits as well.

Research has shown that OTPD offers unique benefits for teacher training. For example, it is common for OTPD researchers to note the advantage of “anywhere anytime” learning and the development of “lifelong learners” (Farrell, 2001; Abdal-Haqq, 1996; Carter, 2004; Dede, 2008). Yanes, Lowry, Anzie & Sumard (2003) conducted a review of research literature on OTPD that provided a bird’s eye view of the characteristics that embody this new form of TPD delivery. Their review concluded that OTPD affords teachers the ability to select individualized TPD, to direct and manage their own learning, to engage in TPD that is reflective and ongoing and allows teachers to develop a community of learners over time.

One of the primary concerns associated with OTPD is that teacher understanding and comprehension may be stronger in a face-to-face environment than when the physical nature of the classroom is removed. Typically, experimental research comparing participant understanding in an online environment with that of understanding of

participants in a face-to-face environment has produced no significant differences in understanding between groups. Bernard, Abrami, Lou, and Borokhovski (2004) conducted a review of literature comparing eLearning with classroom instruction. Their review was a meta-analysis of empirical research in the field. The analysis concluded that there were no statistically significant differences between understanding in an online environment and a classroom environment in any of the research studies reviewed. In 2007, Schneider, Dworkin, Gengler, and Olson conducted an experimental study comparing the understanding of participants in each of the learning environments discussed. This research also found that there were no statistically significance differences in gains in content understanding between the two types of participants.

The findings in each of these studies are consistent with the majority of the literature comparing online learning with face-to-face learning. To this point the research literature has indicated there are no statistically significant differences in comprehension between participants receiving PD online as opposed to face-to-face. The supplementary benefits afforded by OTPD, therefore, make this new type of learning environment advantageous, as the added benefits of online learning are all traits related to high quality TPD.

A synthesis and analysis of previous research done on OTPD uncovered two overarching themes with regard to the benefits of TPD being moved online: increased benefits for teachers and increased program and participant cost-effectiveness. Also included in this section of the review are the research findings indicating that disadvantages of OTPD also exist. To note, however, an analysis of research on the drawbacks of OTPD combined with a synthesis of effective OTPD facilitation research

has indicated that many of the commonly noted drawbacks of OTPD can be curbed by effective OTPD facilitation.

Teacher Benefits

OTPD is a successful and effective means of TPD delivery for a number of reasons, including increasing the value of teacher's learning as well as providing personal and professional benefits to teachers. Such supplemental advantages include: the formation of a community of learners, longitudinal training, preparing teachers to succeed in a knowledge based society, increased assimilation of information, development of lifelong learners, flexibility, direct impact on the classroom, reflective practice, anonymity, self-directed training, individualized content and reflective learning.

The debate about learner isolation as compared to the formation of learning communities is found throughout the literature on OTPD. While some studies have indicated that online learning promotes the formation of communities by allowing for synchronous and asynchronous discussion at anytime participants are available, other research has found that online learning promotes isolation, which leads to learner frustration and a higher attrition rate in online training than face-to-face training (Sun et. al, 2008; Smart & Cappel, 2006; Brown, 1996; Hara & Kling, 2000; Picciano, 2002; Tyler-Smith, 2006).

Appana (2006) and Atkinson & O'Connor (2007) have noted that the method of delivery in OTPD allows for greater communication by teachers because participants in an OTPD course can respond or participate at their own pace. Participants who were not prepared to respond immediately are therefore still afforded the opportunity to contribute to the discussion.

To this end, collaborative learning can be achieved throughout the world because participants are not bound by geographical location. Appana (2006) through his research on the benefits and drawbacks of eLearning concluded that all learners, even those in distant or disadvantaged locations, realize the exchange of quality information through online learning. His research also found, however, that the changing nature of technology, while providing many benefits such as “anywhere anytime learning” is also hindered by the complexity of network systems and is threatened by the commercialization of education. Smart & Campbell (2006) echoed these concerns by indicating that the online method of asynchronous discussion and the complexity of network systems lead to a loss of spontaneity. This form of interaction can also result in a lack of overall stability in the course, if the same participants are responding each time and some participants feel lost (Smart & Campbell, 2006). OTPD facilitators must be trained to ensure that all participants are actively engaged in the conversation whether the discussion is synchronous or asynchronous. Facilitators can further promote spontaneity if trained to effectively include a synchronous component to the course (Delfino et al., 2006).

Atkinson et al. (2006) further concluded that OTPD increased networking and led to longitudinal teacher learning communities. Networking removed feelings of isolation, fostered reflection on practice and influenced teaching practices. It was found that the learning communities persisted after the course ended allowing for continued reflection and lifelong learning. Salmon (2004) has cautioned, however, that if facilitators do not promote the formation of learning communities, OTPD programs will realize high rates of attrition. Tyler & Smith (2006) echo many of the contentions made in the literature

when they discussed facilitators' need to be trained to actively engage participants, not to overload them, and to know when to step back and let teachers engage in their own discussions and therefore develop communities.

Lowery (2008) conducted an experimental research study through which she assessed the efficacy of online learning community intervention as compared to a face-to-face learning community approach. Results from the study showed that participants in the online learning environment were statistically significantly more likely to indicate that they had experienced greater interaction between participants and thus form learning communities than those participants in the face-to-face course.

OTPD research literature has also indicated that the value of learning can be increased because cooperative learning, sharing of information, and collaboration of teachers across various schools, locations, cultures, and backgrounds can help prepare participants for a diverse, knowledge-based society (Atkinson et al., 2007; Knightley, 2007; Webb-Peterson, 2001). Research such as that conducted by Hara & Kling (2000) and Cavanaugh et al. (2004), however, presented competing findings in that they indicate that eLearning lends itself to a lack of assimilation of information and decreased academic rigor in an environment that separates participants and facilitators and leads to a breakdown of assimilation and cooperation.

Alexander et al. (1994) conducted a study on assimilation of information and effectively reaching all teacher participants online and found that these tasks can prove challenging. The researchers found that differentiating instruction in an online classroom is necessary because not all participants in the course will comprehend concepts similarly. On the other hand, Defino et al. (2007) concluded that if facilitators are trained

to properly differentiate learning in an online environment, appropriate comprehension of information by all participants could be achieved.

Another well-documented advantage to online learning is the development of ‘lifelong learners’. Research has shown that online learning helps mold learners who will continually educate themselves, not only in traditional methods but in approaches that change with the development of technology (Appana 2006). Smart and Campbell (2006), however, have remarked that these learners often face challenges that are associated with the need to adopt new technological skills. If facilitators are trained to be available for assistance throughout the learning process, these challenges will not act as barriers for participant success.

The most well researched debate in the literature surrounding OTPD revolves around the teacher-perceived advantages of OTPD. Peterson (2001) conducted a study on teacher’s perception of the quality of an OTPD course he or she completed. Results from the studies indicated that participants found the quality of the course itself was overall equal to or more effective than face-to-face PD. Participants in the study further noted that the distinct difference between the courses was the flexibility with which the online course was offered.

Knightley (2007) conducted a research study investigating factors that influenced adult students’ participation and successful completion of an online course. Her findings suggested that participants are more comfortable in an online format because anonymity is less intimidating than the pressure incurred in a face-to-face environment. These findings were shared in Appanana (2006), Atkinson & O’Connor (2006), as well as Sun et al. (2008). Each of the studies found that participants in online learning environments

find anonymity to be beneficial to their learning. Individuals who felt intimidated by other participants in face-to-face environments no longer felt that pressure when the physical nature of the classroom was removed. Disabled and English language learners felt more at ease when the physicality of the classroom was removed as well.

Contradicting research has indicated that learning disabled participants and English language learners may feel lost; those who require more individualized attention may not receive it, because the facilitator is unaware of their presence or their challenges (Hara & Kling, 2000; Piccoli et al., 2001; Ryan, 2001). The noted difficulty by challenged participants is one of the reasons that facilitators should be trained to assess continually throughout the course. By ensuring that all participants are comfortable and moving at the same pace, facilitators can allow for all participants to benefit from online learning.

A barrier to online learning that has been documented in the literature is the need for participants to be self-directed and internally motivated learners. Internally motivated learners bring a different set of needs, strategies and motivations to the learning process. In terms of OTPD training, however, this barrier is seen as an advantage. Knowles (1990) has described self-directed learners as independent learners who have grasped concepts in ways that they find most beneficial to them. It is commonly accepted in the literature that adult learners are the demographic most likely to succeed in an online learning environment as they are internally motivated, while youth learners are generally motivated by external factors. Adults are self-directed learners who apply their learning to their surroundings (in this case the classroom) and approach learning as primarily a problem-solving activity. Hase (2003) has noted that adult learners are driven to go

beyond the acquisition of basic levels of knowledge and skills and seek holistic growth. In the OTPD programs they studied, Atkinson et al. (2006) found that teachers highly valued the opportunity to implement practical strategies within their own classroom and that this ongoing reflection promoted continued self-growth.

Self-directed learning has been shown to promote reflective, holistic development. If the training is conducted in a vacuum, however, such development is often not realized. A great deal of research on teacher change has made it clear that a one-time course, class, or seminar is unlikely to result in significant, long-term change in teachers' practice (Richardson, in press). Even the most high quality TPD programs lack longitudinal support for teachers (Carey & Frechtling, 1997). Stokes (2001) indicates that teacher change requires multiple opportunities to learn, to practice, and to interact with other teachers inquiring into their own practice. LaPointe (2007) has further indicated that ongoing OTPD affords teachers opportunities to develop specialized skills and attain advanced degrees – benefits that would not be acquired in a one-day seminar.

Although a great deal of research has concluded that OTPD provides teachers many benefits, disadvantages are apparent in the literature. This section of the review has demonstrated that effective facilitator training can curb many of the drawbacks of online learning, however sub-par online facilitation remains very common in OTPD implementation. Peterson (2001) has stated that it is difficult to recruit well-trained facilitators who have been properly instructed on how to effectively facilitate an online learning course. Porter (1997), Seinger (2000), Hara & Kling (2000) and Delfio et al (2007) have all noted that it requires a unique set of skills to manage the form of interaction present in OTPD courses, and few facilitators have been trained to understand

the online environment. Without proper training even those facilitators who have successfully administered a face-to-face course will feel ill prepared when the physical environment of a classroom is removed from the course.

Program and Participant Cost-Effectiveness

Another debate in the literature with regard to advantages and disadvantages of OTPD revolves around the cost effectiveness of online courses. This debate surrounds the economics of the program as well as the cost effectiveness for the participants who are enrolled in the course. Bartley and Golek (2004) researched the cost-benefits of online learning in depth and concluded that “the benefits to online learning are very real and one should be able to justify any additional cost in terms of what the [program] will gain”.

The general body of research on eLearning economics has found that the start-up costs of online programs are substantially higher than those associated with face-to-face courses. However, as Appana (2006), Sun et al. (2008), Aqff-Haqq (1996) and Bartley and Golek (2004) have shown, the principle of economies of scale allow, over time, the benefits to far outweigh the initial cost. All research on the economics of eLearning concurs that more time is needed to design and develop a high quality OTPD course as compared to a face-to-face course (Appana, 2006; Sun et. at., 2008; Aqff-Haqq, 1996; Katz & Associates, 1999; Bartley & Golek, 2004). For example, course developers must ensure that all links are working properly, navigating to the proper sites, that there is not too much information on each of the websites, that the information is organized properly, and that the course management system (such as Blackboard or Moodle) can support all learners (Sun et al., 2008; Katz & Associates, 1999; Bartley & Golek, 2004).

Additionally, the course content must lend itself to online learning. For example, developers are required to use content that stimulates greater discussion and teacher centered learning. The course must be appropriate for autonomous and self-directed learners.

If appropriate resources are allocated to ensuring that online courses are developed properly, however, less time and fewer resources will have to be used to update or revise courses. In addition, once high quality courses are developed, they can be reused for multiple sessions with only website maintenance and regular checks to ensure that all links are still working. Further, the online delivery format makes editing the course website and replacing broken links easy and cost effective (Appana, 2006).

Additional financial resources have to be used to properly train facilitators who will be delivering the online course. Delfino et al. (2007) and Salmon (2002) have discussed in length the difference between delivering instruction online and delivering instruction in a traditional learning environment. Stodel et al. (2006) has echoed these remarks and contended that facilitators should be provided high quality training to deliver instruction. Dennen et al. (2007) have noted in their research that novice facilitators, those who have never facilitated an online course, may require extra time and training, which will require additional funding. Vonderwell (2007) and Singer (2008) have similar conclusions in their research. Finally, Salmon (2000) indicated that OTPD facilitators who do not receive adequate and appropriate training will be ineffective as compared to those who have.

Much like the realized cost-effectiveness of proper course developer training, if facilitators are trained properly the online program will realize greater participant

satisfaction and will attract more registrants, as research has shown that one of the primary factors associated with predicting participant satisfaction with OTPD is facilitator effectiveness (Smart et al., 2006). Attracting more teachers to OTPD programs will not only spread exemplary teacher development, but also it will assist programs that are lacking viable numbers to achieve sustainability over time.

The new and different markets that are opened due to the anytime-anywhere learning that occurs in online courses also help realize program cost-effectiveness. Aqff-Haff (1996) found that national and international experts could make guest appearances in the course from the ease of their home locations. The program saves resources by not having to fund travel of experts. The experts' appearance can be recorded over the computer so that participants who were not available at the time of the presentation can nevertheless benefit from listening to or watch the recording. Further, participants can take "virtual field trips" at little or no cost to the program. For example, classrooms with teachers implementing content or material being delivered in the OTPD course can be videotaped. The recordings of content delivery can be uploaded to the course management system and current teacher participants can access the video, and therefore "visit" the classroom at a time that they find convenient.

Not only do TPD programs realize financial benefits resulting from moving courses online, but course participants realize cost-effectiveness in a number of ways as well. One of the most commonly noted advantages of online learning indicated by adult learners is the flexibility with which courses can be taken. This is beneficial to participants' schedules, and it also affords them the ability to remain at their job and not have to take time away from the classroom to participate in a PD course. Atkinson &

O'Connor (2006) and Ebersole (2008) have found that other benefits of completing a TPD course at a time most convenient to the learner is that he or she does not have to spend money traveling to the course site, nor does child care have to be provided for participants with children. Some research in the field does present financial drawbacks to completing online courses. The materials necessary to complete an online course, such as computers, are much more expensive than those needed to complete a face-to-face course. In addition, if a participant has technological challenges and must have his or her computer repaired it can be very costly (Bartley & Golek, 2004; Sun et al., 2008).

The Department of Education, in their *Digest of Education Statistics* (2007) reported that 100% of schools in the United States had internet access available to all students¹. These advancements have also prompted many districts and schools to implement one-to-one laptop initiatives which provide each teacher and student in the school with his or her own laptop with wireless Internet access. The Educational Commission of the States (2006) has documented that many schools are also employing information technology departments to assist teachers with computer problems they may experience. These developments can assist participants who are incurring personal costs by making public computers available to teachers completing OTPD courses.

Facilitating Face-to-Face PD Versus Facilitating Online PD

Facilitators are an integral component of teaching and learning occurring in all learning environments. These individuals maintain structure and order, motivate learners, encourage participation and convey knowledge. Stromso et al. (2007) note that all tasks associated with effectively facilitating a course can prove challenging, however

¹ This statistic fell between 99.5% and 100%, so it was rounded in the Digest to 100%.

when the physical nature of a classroom is removed, the tasks become even more daunting. Delfino et al. (2007) further contend that an individual may be a veteran facilitator in a face-to-face classroom, and therefore assume he will be a skilled OTPD facilitator. However, whether an individual has delivered a face-to-face PD course in the past does not equip her with the skills necessary to meet the challenges faced when instructing an OTPD course. Effective facilitation, as indicated in the literature, includes assisting participants in reducing stressful situations and making the most out of their online experience (Bostron et al., 1995; Brandt, 1997; Chang, 2001; Collision et al., 2000).

Traditional facilitation is most closely understood to mean promoting learning. A facilitator is responsible for moving a class/course/program forward at an acceptable pace, maintaining motivation, participation, and adherence to procedures and deadlines. A facilitator can be a team leader, task manager, an individual who conducts meetings, or a variety of other roles where he or she has taken the lead.

Stramoso et al. (2007) stated that facilitators should be familiar with frameworks for designing and leading planned sessions or events. In that, the facilitator should be aware of the content that he or she will be transferring to the participants of the course. This preparation takes time and is taught by a higher-level instructor. A facilitator should further be knowledgeable in understanding and implementing a range of strategies and techniques for developing and maintaining consensus. That is, he or she should not simply convey information but rather guide a group discussion until all individuals involved in the program have reached an appropriate outcome. Gaytan & McEwen (2007) contend that a facilitator should further be able to deal with disruptive behavior

without causing more disruption in the course, and ensure all participants remain on-task through the whole of the meeting or course.

Possibly most important is a facilitator's sense of confidence in him or herself. Yoder (2003) indicates that an effective facilitator must believe in him or herself to the point that this is transferred to the participants in the meeting or program and then they too, believe in the facilitator. A strong sense of confidence allows a facilitator to become energized and take on the challenging role of a leader. Each of these skills is necessary to effectively facilitating a high quality course, but additional skills and best practices are necessary to effectively facilitate in an online environment.

Sahin (2007) found that satisfaction with a course facilitator is a statistically significant predictor of participant satisfaction with an online course. This finding is consistent with a large body of research in the field. This research supports the contentions made by Chen & Guo (2005) and Schmidt & Gallegos (2001) who found that facilitator support, such as timely help, useful feedback, easy communication, relevant discussions, and encouragement to participate are all predictors of participant satisfaction.

Delfino et al. (2007) concluded that facilitators had to adjust their teaching style from that used in a face-to-face environment to one that would be effective in an online course. These findings are consistent with those by Vonderwell et al. (2007) who, through their case study found that asynchronous learning tools, although extremely beneficial to online learning must be completely understood and managed by facilitators. They found that integral to best serving participants, facilitators must have a sound understanding of the pedagogical characteristics of online learning and asynchronous

communication tools. The noted differences between online and face-to-face facilitation are shared across a great deal of literature

In a virtual environment, a facilitator is challenged to address the individual needs of each of the participants and increase comfort levels and therefore participation of all learners. Participants in an online learning environment take on a greater cognitive load than students participating in a face-to-face learning environment. Gaytan et al. (2007) indicate that online learners are often presented with nonlinear online materials, websites that contain a greater amount of saturated information, and sometimes improperly arranged online materials. Littlejohn (2001) has found that learning in a cyber-classroom requires a greater number of cognitive processes than those that are required by traditional learners in a face-to-face learning environment. These processes include the location and navigation of a variety of embedded links, as well as comprehension of how to gain assistance if a link is not working properly, and the understanding of downloading and uploading materials. As each of these processes is unique to online learning, the instructional practices employed in the traditional classroom no longer satisfy all of the needs of the online learning environment.

Spatariu et al. (2007) has further remarked that online learning lends itself to unique discussion between the course facilitator and participants, as well as among the participants themselves. While proper discussion techniques are necessary in a traditional classroom, scaffolding for doing so is even more important in a cyber-classroom. Online discussions are more complex than face-to-face discussions, because in the latter environment a facilitator can take non-verbal cues from his or her participants, cues that don't exist in the online environment.

Zembylas & Vrasidas (2007) note that in a face-to-face environment, a facilitator can informally assess his or her participants by observing facial expressions, body language, and gestures. In an online environment, however, these non-verbal cues do not exist and therefore a facilitator must be trained to properly understand cues in a non-traditional fashion. Youngblood et al. (2001) furthered this contention by stating that providing nonverbal cues is stripped from an online facilitator. That is, he or she is unable to speak through body language, gestures, or facial expressions. Another challenge in this new environment is the lack of tone. Neither facilitators nor participants can project thoughts through their tones, making communication more difficult (Youngblood et al., 2001). Each of these challenges is new and different to individuals who have facilitated a face-to-face program in the past. No longer will the traditional teaching methods work for all students. With the dawn of the online classroom, instructors must make themselves open and available to the new methods and strategies necessary to facilitate a successful OTPD course.

Delfino and Persico (2007) found that online facilitators had to adjust their teaching style to an online methodology. These findings are consistent with those by Vonderwell, Liang, and Alderman (2007) who, through their case study, found that asynchronous learning tools, although extremely beneficial to online learning must be understood by facilitators before they will prove effective. The authors stated, “Educators are faced with the question of understanding the pedagogical characteristics of online learning and asynchronous communication tools to best serve students.” Spitzer (1998) remarked, “those involved in distance education grossly underestimate the difficulty involved in changing deeply entrenched teaching and learning habits, and

consequently we grossly underestimate the difficulty of changing from a traditional classroom environment to a distance learning context” (p.53). Salmon (2000) indicated that untrained facilitators “take longer and do less well” (p.56).

Training to Effectively Facilitate Online Teacher Professional Development

Given the rationale that facilitating OTPD requires skills and best practices that are different from facilitating face-to-face PD, an important component of any OTPD program should be a facilitator-training course. After an extensive review of the literature, only one OTPD program was found that required individuals to complete a facilitator-training course; this is the program studied in this research. The lack of programs requiring online facilitator training programs is daunting, especially in light of the extensive research documenting the importance of training online facilitators as well as the literature noting the areas in which OTPD facilitators should be trained.

In response to the recent boom in OTPD, the Southern Regional Education Board published standards for planning and evaluating online professional development courses and programs. Included in these standards was a remark on the need for facilitators being highly qualified in their subject area and well trained in online course facilitation (SREB, 2007). The document stated:

“Program is delivered by an online [facilitator] with content knowledge and the ability to communicate effectively in writing, as evidenced in the course syllabus, learning activities, instructions, threaded discussions and email.” (p.4)

The document further states:

“Program is provided by an online [facilitator] with knowledge of online learning strategies. Using these strategies ensures quality and frequency of participation” (p.4)

One of the largest bodies of literature on the importance of online facilitator training comes from the research of Gilly Salmon who has published numerous books and articles documenting the importance of eLearning, OTPD, and OTPD facilitator training. Salmon (2000, 1999, 2002) has also noted the importance of training facilitators in an online environment, as it is the same environment in which they will be delivering OTPD. Salmon remarked:

“Any significant initiative aimed at changing teaching methods or the introduction of technology into teaching and learning should include effective [facilitator] support and training, otherwise its outcomes are likely to be meager and unsuccessful” (Salmon, 2003, p. 80)

In a White Paper presented at the U.S. Department of Education Secretary’s No Child Left Behind Leadership Summit, Klieman discussed the emergence of OTPD and outlined the key components of effective OTPD that would subsequently result in effective TPD and produce positive student outcomes. Klieman remarked:

“[Facilitating] online is different from [facilitating] face-to-face, and instructors who teach online should receive training in online communications and course facilitation” (Klieman, 2007, p.10)

In their article describing successful OTPD, Treacy and Peterson (2001) not only agree with the previous research presented indicating that online facilitators should be trained specifically to deliver instruction online, but they concur with Salmon’s contention that the training should be delivered in a like environment. It is their belief that such training will prepare facilitators for barriers possibly faced by teachers in their course. In addition, the authors contend that training OTPD facilitators promotes growth and capacity building of local OTPD programs, which allows for longitudinal training.

Although an exhaustive review of the literature on effective online facilitator training specific to OTPD did not reveal systematic examinations of training programs, a great deal of literature has not only been done on the general importance of training OTPD facilitators, but in the specific areas they should be trained. A synthesis of this literature found four primary areas in which online facilitators should be trained in order to deliver effective OTPD and garner participant satisfaction. These areas were: understanding new and different participant processes, understanding how to effectively develop a learning community, understanding how to manage the unique communication of an online learning environment, and facilitating a course that begins with management being the facilitator's responsibility and gradually transfers that responsibility to the participant to direct his or her own learning. Alderman et al. (2007), Alexander et al. (1994), and Brandt (1997) have also noted the importance of: asking questions that guide discussion and empower participants to ask questions of each other, conveying emotions when non-verbal cues are unavailable, and continual assessment throughout course implementation.

A virtual environment is new and different to many online learners and as such fear, anxiety, and a lack of confidence is common in participants (Ebersole, 2008). Facilitators must be prepared to manage these barriers to promote participation and combat attrition. OTPD facilitators should be trained to create an inviting environment by employing familiar vocabulary and emoticons (pictorial representations of emotions), and encourage the same interaction among participants.

Facilitators should be trained to set the scene early in course implementation, since participants cannot meet each other face-to-face and establish a physical

connection. A facilitator should always remain positive and excited about the course. To make an early familiar connection, a facilitator should use a biography, photos of him or herself, or emoticons, for example. By indicating one's excitement to be involved in the OTPD program, a facilitator is generating excitement and feelings of comfort with participants (Denman et al., 2008). A facilitator is further responsible for generating a comfortable environment by publicly responding to each person's messages, and in these responses the facilitator should show his or her personality, to strengthen group connection with the facilitator. If a facilitator responds to participant inquiries only privately, it does not help generate a sense of community.

Hobaugh (1997) has found that the socialization component that is a norm in face-to-face professional development is often overlooked in OTPD courses. Richardson (2006) indicates that if facilitators are trained to utilize interactive technologies to their full potential and incorporate online resources such as instant messaging, web cameras, blogs and vlogs, similar socialization found in face-to-face TPD can be realized in OTPD.

Facilitators' enthusiasm has been shown, in the research literature, to be related to participants' attitude toward online learning. Ellis & Phelps (2000) found that online participant motivation is related to the amount of interaction with facilitators and enthusiasm conveyed from facilitators. Hase (2003) has found that facilitators who have been perceived by participants as emotionless evoke feelings of isolation, anxiety, and nervousness.

After a comfortable and inviting environment has been established, an OTPD facilitator must then set clear expectations for the course early on in program

implementation. Facilitator expectations in virtual platforms do not mirror those commonly conveyed in face-to-face environments. Vrasidas & Glass (2004) have indicated that facilitators in online communities must be trained to place much greater emphasis on learner participation. Alderman et al. (2007) have remarked that facilitators should outline how an individual's grade in the course will be determined; assessment in online learning is dissimilar to assessment in face-to-face classrooms, as participation often makes up a much larger portion of the grade. Littlejohn (2001) has found that if a facilitator is not trained to make these points clear, there is often confusion from participants who are used to learning in a traditional classroom.

In an empirical study of online facilitation conducted by Chang (2001), he found five characteristics that most students preferred in their facilitators. Two of these characteristics are: facilitators who “[made] due dates of assignments and activities flexible and explicitly clear and facilitators who thoroughly communicated with students about the expectations of assignments and grading.”

After setting the scene and making course expectations clear, a facilitator must then effectively assist participants who are having difficulty navigating course links or managing the nonlinear material on various web pages. Participants who cannot navigate through sites with ease tend to isolate themselves from the community of learners, fade into the background of the course, and sometimes withdraw from the class because they find they are getting lost in the interactions (Chang 2001). To overcome these barriers, facilitators model the process of navigating to websites that are not embedded in the course, and demonstrate how to appropriately manage non-linear materials. Muirhead (2004) has added that trained facilitators continually assess the needs of participants by

asking direct questions about tasks such as navigating links and managing non-linear material, and offering support when necessary.

While traditional verbal feedback cannot be given to facilitators in online learning, this does not mean that course evaluation is absent. Course evaluations in online learning are more important given the nature of the delivery. Traditionally, facilitators will use a summative survey to allow the students to express their thoughts about the course and hold the facilitator accountable. This feedback can prove useful when designing a new online learning course or revising the current one for a subsequent cohort of participants (Coogle et al., 2002). Formative surveys at interim points are also used to assess learner comprehension of material as well as student attitude toward facilitation, discussion, and workload (Githens, 2007).

In addition to understanding how to facilitate new processes, the development of learning communities has emerged in the research as a skill that effective online facilitators should master. Robinson & Darling-Hammond (1994) have outlined the essential characteristics associated with effective collaborative communities. These features include: open sharing of information, ongoing commitment to the community, collaborative decision-making, common goals, mutual self-interest, and mutual trust and respect. Goddard, Hoy, & Woolfolk-Hoy (2004) indicated that teachers who took part in professional communities have indicated a high sense of efficacy and have reported success with their students. Facilitating community development is made much more challenging when physical interaction is removed (Moore & Thompson, 1997).

Allen (1997) outlined three practices OTPD facilitators should be trained to implement to encourage participant interaction and build a learning community.

Facilitators should ask questions that empower participants to question each other. Facilitator's inquiries should not prompt direct responses; rather they should elicit rich discussion. Facilitators should respond to the community as a whole rather than direct all responses to individual participants outside of community interaction. Collinson, Elbaum, Haavind, and Tinker (2000) have echoed these contentions recommending that OTPD facilitators ask questions that produce deeper thinking, require learners to summarize information, and provide feedback that promotes deeper reflection. Verdejo and Stefano (2006) cited Alexander et al. (1994) as indicating that community interaction in eLearning will not come to fruition should a facilitator not understand the appropriate phrasing to use when posing a question or if they are unaware of the correct follow-up explanations to provide. Should a facilitator pose questions effectively and follow-up accurately, he or she will succeed in promoting communal discussion and critical thinking (Bostrom et al., 1995; Chang, 2001; Collision et al., 2000; Cosner & Peterson, 2003; Dennen et al., 2007).

The promotion of critical thinking is a cornerstone of effective OTPD. Therefore, it is important that facilitators understand the types of questions to ask and the correct online tone to use to form the questions. If a question is asked improperly, it can curb a discussion leaving the participants nothing to learn from one another. Dennen et al. (2007) remarked that participants in their study of the perceived importance of particular facilitator actions on performance and satisfaction indicated that facilitators' ability to maintain a rich discussion that promoted critical thinking was key to satisfaction. Delfino et al. (2007) indicated that an effective online facilitator must be trained in how to properly ask questions and promote discussion online. Using supportive comments can

help stimulate a conversation, encourage more participants to contribute, and extend conversation. Novack et al. (2007) further noted that another important task of a facilitator is to avoid providing assistance to individual participants without full group knowledge. Unlike extra-help in a classroom, an online environment lends itself to full group participation. Facilitators should respond to individual emails in a full group manner. Delfino et al. (2007) concurred with this contention and noted that the only time a facilitator should address a participant with individual emails should be when inquiring about a lack of participation or formatively assessing comprehension of material.

Although questioning and discussion are important, reflection is shown in the literature to be equally, if not more, significant to effective community development. For a participant to learn from his colleagues and intelligently contribute to a discussion, he must reflect on the comments of other members of the course before providing a thoughtful response. Vrasidas & Glass (2004), Sahin & Ismail (2007), and Vonderwell et al. (2007) have all agreed in their research that an effective online facilitator is aware of how to promote such reflection. Delfino et al. (2007) indicates that successful strategies of an online facilitator include understanding the cyclical nature of asynchronous discussion and comprehending the importance of not permitting a posted topic to be abandoned on a discussion board. An effectively trained facilitator would continually return to posted topics allowing for reflection and discussion. Alderman et al. (2007) echoed these contentions when they noted the importance of understanding how to properly assess asynchronous discussions and promote community building by addressing topics posted that had not yet been fully discussed and understood by the community.

Monitoring participation, both synchronously and asynchronously, is a necessary component of online facilitation as well. Another characteristic of online learning that Chang (2001) found participants to indicate as necessary is a facilitator who “employs learner motivational strategies...” Participants, therefore, prefer a facilitator who is monitoring progress and discussions consistently and requesting participant contributions when such are not being provided. Facilitators should contact students on a personal, off-line basis to discuss participation (Delfino et al. 2007). It is important to note, however, that this contact can also be the result of a participant taking over conversations and not permitting contributions from other individuals (Novack, et al., 2007). The facilitation of appropriate and equal contribution to discussions therefore requires constant monitoring and maintenance of on-topic conversation (Spataria, et al., 2007). An online facilitator then must understand how to properly monitor the work that each member, and each collective group, is accomplishing (Salmon 2000). To that end he or she will be able to develop a supportive, participant-centered learning community.

Another skill facilitators must hone is the ability to begin the course as a manager of learning, possessing the majority of the responsibility in the learning community. As the course progresses, the facilitator should be able to gradually transfer the responsibility of manager of learning from himself to the community of learners. This task is met by effectively implementing the strategies associated with online community building and gradually retracting further out of communal discussions. By the end of the course each participant should be acting as a self-directed learner.

The skills and best practices for training online do not parallel those necessary for delivering face-to-face training. Research has shown that merely mimicking face-to-face

TPD in a virtual platform does not guarantee an effective TPD experience (Levenburg & Major, 2000). The training provided to OTPD facilitators should be dedicated specifically to developing expertise in facilitator training techniques (Carter, 2004; Singh et al., 2007; Githens, 2007; Singer, 2008; Zygouris, 1997). Further, the training should occur online allowing facilitators to gain experience in the same setting in which they will be delivering TPD in order to experience first hand the challenges or frustrations their participants may face.

Policy Implications

At the forefront of all educational policy is, and should be, advancing the academic achievement of students. Darling-Hammond (1998), among other researchers, has concluded that teacher quality is, without question, the primary factor associated with promoting student achievement in the classroom. Paramount in teacher training and preparedness should be a solid foundation in the content being taught, skills and best practices for high quality pedagogy, and an understanding of child or adolescent development and psychology. This training, however, should not subside upon entrance into the field. Rather, it should occur as ongoing training throughout a teacher's career (Supovitz et al., 2000).

Research literature that aligns with Darling-Hammond's furthers this contention by indicating that the importance of teacher quality trumps policy issues surrounding standards, funding, and class size (Geringer 2003). Even with the understood importance of teacher training, current policy makes it difficult for administrators to involve their teachers in TPD program choice as the Title II resources received by schools is so limited (Colbert et al., 2008). Administrators should be selecting TPD that allows teachers to

learn new behaviors that are specific to their needs; that allows them to create a network of lifelong learners and a community of teachers; and provides opportunities for continued, reflective training, as these traits are characteristic of quality TPD (Bonner, Garet & Porter, 2007). These programs, however, must also meet the budget constraints of districts.

A review of literature that was published prior to the reauthorization of the Elementary and Secondary Education Act suggested that districts had begun to reinvent their TPD, moving more toward community based teacher development and a focus on network building. These changes were allowing for the implementation of TPD programs that more closely aligned with the features characteristic of high quality TPD: community formation, reflection, and ongoing implementation. The standards associated with NCLB, however, have resulted in scripted teaching, mandates, and strict accountability. These new stipulations have lead districts back to the top down model of professional development (Colbert et al., 2008). Collaborative and autonomous TPD is necessary for teacher improvement; the movement away from community based TPD, therefore, is detrimental to teaching and learning. Further, administrators selecting the standards based TPD are generally removed from the classroom and therefore unaware of the importance of individualized training. As a result, administrators are selecting TPD that seemingly adheres with NCLB policy but does not meet the specific needs of many teachers.

Research has shown that narrowing of the Title II regulations would benefit TPD. Currently, Title II funds are allocated according to a formula that takes into account variables such as district enrollment and poverty status. While researchers have not

suggested that this formula should be changed, many do propose to narrow the selection of TPD options available to districts utilizing Title II funding. These revisions include the need to select TPD programs that have been evaluated, provide research evidence of effectiveness, and are focused on specific teacher's needs (Sawchuk, 2008). Prior to such legislative action occurring, however, demonstration of effective delivery is necessary.

Previous Research on OTPD Facilitator Training Evaluation

Traditional face-to-face TPD is scarcely evaluated. Overall it is commonly accepted as being “good” (Guskey, 1999, p.2). To this end few effective models for evaluation of TPD are present in the literature. Therefore, determining a model for effectively evaluating OTPD programs is an even greater challenge (Gunawardena et al., 2000; Friedman et al., 2002). One study published by Hahs-Vaughn, Zygouris-Coe, and Fiedler in 2007 presented a hybrid approach to evaluating an OTPD program. The logic model used in the study combined Guskey's five level approach to evaluating an effective professional development program with the Sloan Consortium's five pillars of quality online education. While this study does not incorporate a model for evaluating facilitator effectiveness, it does conclude by indicating that facilitator evaluation is essential as is the evaluation of large-scale OTPD programs.

OTPD programs are multidimensional and little precedent has been set for evaluating their effects. The need for developing a model for determining the impact of an online facilitator-training program as it relates to OTPD outcomes and student impacts are therefore apparent.

Summary

As evidenced in this literature review, TPD is necessary to contribute to student achievement (Desimone et al., 2006; Fullan & Miles, 1992; Borko, 2004; Cohen, 2000; Colbert, 2008; Corcoran, 1995; Hill, 2004; and Darling-Hammond, 2000). Districts are being challenged to find innovative, cost-effective means by which to deliver individualized, ongoing, high quality PD to their teachers. OTPD is emerging as an effective means by which to meet these needs.

This review of the research has made the case that techniques necessary for facilitating an online course do not parallel those necessary for facilitating a face-to-face course. What this review has further indicated is that systematic examinations of facilitator training programs and models for effectively evaluating OTPD facilitator training programs are lacking in the literature. As has been previously indicated, a significant portion of Title II funds is being allocated to TPD. PD has the potential to contribute to the increased achievement of students. If PD is going to continue to move online, ensuring that the individuals delivering the instruction are properly trained is a moral imperative.

With the boom of advancements in technology and online instruction, it is vital that project directors not lose sight of the importance of ensuring that the professional development being delivered online is of high quality and rigor (Treacy & Peterson, 2001). Issues of course implementation must be thoroughly examined to guarantee equitable, fiscally sound, and high-quality offerings. Educational leaders and program directors must become well informed about the difference between facilitating online and facilitating in a face-to-face environment and the need for OTPD facilitator training. It is

time that systematic evaluation of OTPD facilitator training takes place. Understanding the impact that training individuals to teach online has on teacher and student outcomes is crucial for educational leaders in order to promote successful OTPD for all teachers. Currently this important component of OTPD has been overlooked in the research.

This research expects to fill the void present in the literature by providing results of an examination of an OTPD facilitator-training program, as well as a model for replication by other OTPD programs. This research will examine the need for high quality OTPD facilitator training courses by looking at the relationship between the effectiveness of a facilitator training course and teacher and student outcomes of interest. It will attempt to establish an evaluation model that can be used in other OTPD programs.

Chapter 3 will describe methods for identifying the effects of a specific online facilitator-training program model employed in what is currently one of the largest OTPD initiatives in the country. While experimental designs are ideal when attempting to identify effects, the design of eLearning for Educators evaluation makes an experimental design to measure facilitator training effectiveness impossible. This research, therefore, employs a systematic evaluation of the effects of a facilitator training program. Chapter 3 will describe the use of statistical predictor models to measure the relationship between facilitator perceptions of the training program effectiveness and teacher and student outcomes of interest. The study focuses on outcomes such as teacher: likelihood to complete the TPD course, likelihood to implement the material in her classroom, likelihood to take another TPD course, rating of course quality, and reported student impacts. In these ways, this study will make a unique contribution to the TPD and OTPD literature, as the evidence provided will be the only study examining the relationship

between training facilitators to deliver OTPD and teacher and student outcomes of interest.

CHAPTER 3

METHODOLOGY

Introduction

Chapter 2 provided the background on research and evaluation studies that have investigated TPD, online learning, OTPD, its advantages and disadvantages, and the need for effective facilitation. As the review of the literature revealed, available research falls short of providing strong evidence of the effects of an online facilitator-training program designed to train individuals to deliver TPD specifically in an online environment. This void is due, in part, to very few OTPD programs utilizing such a training program. Where OTPD programs might be positioned to have a strong positive impact on TPD outcomes, researchers have failed to identify net impacts. This chapter presents a research design to study a particular OTPD facilitator-training program and its impact on TPD outcomes of interest.

The first section of this chapter presents the research questions under investigation and the research hypotheses that will be tested. The second section presents information about the intervention. The third section describes each of the data sources and data collection methods. The fourth section breaks down each of the research questions and discusses the respective samples, variables and analytic procedures that will be used to test the research hypothesis. The final section of this chapter summarizes the methodology employed in this research. This chapter, in conjunction with chapters 1 and 2, comprise my dissertation proposal.

Research Questions

TPD is defined as a set of learning opportunities that engage educators' creative and reflective capacities in ways that strengthen their practice (Bredeson, 2003). OTPD is intended to provide high quality, individualized TPD that promotes educators' ongoing, reflective training while allowing for increased flexibility, new learning opportunities, and direct classroom impacts (Farrell, 2001; Appana, 2006; Atkinson et al., 2007; Peterson, 2001; Ebersole, 2001). The eLearning for Educators initiative is an OTPD program that, in response to literature documenting the importance of training facilitators to teach online, has developed a facilitator-training program that is required of all individuals delivering eLearning OTPD courses. This research will examine the effects of the unique program. As systematic examination of the effects of such a program has yet to be conducted, the results from this study expect to contribute to the existing literature in the field.

The problem that this dissertation seeks to address is the fact that although OTPD is a viable alternative to traditional face-to-face TPD, too few OTPD programs require that facilitators are trained in the skills and best practices for teaching online leaving them ill-equipped to provide high quality OTPD. The objective of this research is to demonstrate the need for OTPD facilitator training courses as a component of OTPD programs by establishing a statistically significant relationship between training course effectiveness and TPD effectiveness. Previous research has shown that effective TPD indicators include: high teacher ratings of course quality, low attrition rates, ongoing and reflective practice, direct classroom implementation and positive student impacts. The

following questions are intended to address the research problem and meet the research objective. Each of the questions is grounded in relevant literature.

(1) To what extent are facilitators' self-reported ratings of training effectiveness related to teachers' perceptions of course quality? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will be positively related to teacher perceptions of OTPD quality after controlling for facilitator and teacher experience characteristics.

(2) How is teachers' completion of an OTPD course influenced by facilitators' self-reported ratings of training effectiveness? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will increase the likelihood of teachers' completing their respective OTPD course after controlling for school characteristics.

(3) How is implementation of TPD content in a teachers' classroom influenced by facilitators' self-reported ratings of training effectiveness? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will increase the likelihood of teachers' implementing the learned PD content in their classroom above and beyond the effect that school characteristics have.

(4) To what extent are facilitator ratings of training course effectiveness related to teacher reported ratings of student achievement? My hypothesis is that higher self-reported ratings of training course effectiveness will result in higher teacher reported ratings of student achievement above and beyond the effect that teacher characteristics have.

(5) How is a teacher's future enrollment of OTPD influenced by facilitators' self-reported ratings of training effectiveness? My hypothesis is that higher facilitator self-reported

ratings of training course effectiveness will increase the likelihood of teachers enrolling in a future OTPD course.

Intervention

EdTech Leaders Online (ETLO) is a project of the Educational Development Center (EDC) that is designed to build individual program's capacity to deliver online teacher professional development to teachers and administrators in various educational communities. In response to the growing need for high quality professional development, EDC partnered with Alabama Public Television (APTV) to design a sustainable program to this TPD to all educators regardless of time or geographical constraints. In 2005, EDC and APTV, under the Ready to Teach grant, secured 22 million dollars in federal funds to design, implement, research and evaluate such a program, known as eLearning for Educators. Eight states joined the initiative and, within each state, partnerships with the state Department of Education and the Public Broadcasting Station were formed. These partnerships allowed for rapid expansion of the program and the development of specific plans for individual state sustainability and capacity building. EDC and APTV also partnered with the Center for the Study of Testing, Evaluation, and Educational Policy and inTASC at Boston College to conduct a large-scale evaluation of the program as well as a controlled research study.

Currently, eLearning for Educators employs a community-based capacity building model to spread OTPD across the country. The initiative consists of OTPD facilitator training, OTPD course developer training, and OTPD course delivery for educators throughout the country. To date, teachers can select from one of over 70 courses developed to meet specific educator needs. Each component of the eLearning for

Educators initiative was designed in accordance with the relevant literature on online learning as well as the SREB *Standards for Online Professional Development Delivery and Evaluation*.

The fundamental premise of the program is to provide teachers with high quality TPD while also affording teachers each of the benefits that online learning has been shown to produce. eLearning for Educators program directors indicate that the initiative provides increased access to meet the individual learning goals of all teachers. That is, even teachers who do not have access to content-specific TPD locally can still take part in need-based TPD activities. The program further allows teachers to gain experience in using technology; so that even novice technology users might feel comfortable using technology with their students. The courses also provide teachers with a toolbox of rich multimedia resources and new technologies that they can use in their classroom promoting differentiated instruction to meet student needs.

eLearning for Educators affords teachers the ability to experience anytime, anyplace TPD that provides collaborative learning opportunities with other educators. In doing so, the program permits direct impact on classroom learning and reflective practice. Teachers who have successfully completed an eLearning course have indicated that one of the most appealing aspects of the program is that they can implement the learned TPD in their classroom and then return to the course to reflect on the implementation with a community of teachers (Smith, Dash, Chapman & Pedulla, 2008).

As a whole, the eLearning program is grounded in research on effective online learning and OTPD including effective course facilitation. Individuals selected to facilitate eLearning courses are required to have demonstrated experience in an

educational environment, mastery of the content he or she will be delivering, and demonstrated leadership experience (EdTech Leaders Online Website).

Through the initial program design phase, program directors also recognized the extensive literature on the differences between face-to-face facilitation and online facilitation. They concurred that whether an individual had facilitated face-to-face PD in the past has little bearing on whether he or she will be effective in an online environment. To maintain high standards, therefore, a facilitator-training program was developed and required of all eLearning facilitators. The program is titled *Facilitating and Implementing Online Professional Development*.

The training course was designed to ensure that OTPD is not only developed to meet high standards but that it is delivered effectively as well. The course is a ten-week course that prepares teams of individuals to be “Online Professional Development Specialists.” Facilitators are trained in skills and best practices for delivering OTPD to teachers and integrating OTPD into existing TPD programs. Requirements of the course consist of: completion of a pre- and post-survey, online readings, web-based activities, facilitated online discussions and development of a plan for delivering an online course to teachers and administrators. The general themes taught in the course were selected in response to the literature on effective online facilitation. The themes include: setting the scene and conveying emotion virtually, facilitating synchronous and asynchronous discussion, online assessment, understanding the importance of equity and access to technology in schools, providing differentiated and teacher centered instruction, identifying and managing “loners”, addressing the needs of adult learners, and combating

attrition. Each of these themes is clearly expressed in the literature as being areas that online facilitators should be trained in prior to delivering a course online.

In addition, the facilitator training course is presented online in the same format and platform as the OTPD courses so facilitators can experience the environment in which they will be delivering OTPD. The hands on experience, which allows facilitators to act first as learners and then instructors, prepares individuals to manage challenges faced by their participants. Facilitators are also registered in an online community of facilitators where they can share experiences with other facilitators and discuss challenges and successes while offering advice to other facilitators in the community even after the course is completed (EdTech Leaders Online, 2006). Individuals who successfully complete the training course are then permitted to facilitate an eLearning course that is aligned with their background experience. The eLearning courses are six week long OTPD courses focused on either a specific content area, such as “Reading First: Building Blocks”, pedagogical training, such as “Differentiated Instruction to Accommodate Learning Styles”, technology training, such as “Designing a Virtual Field Trip” or administration, such as “Data Based School Reform.” Like the facilitator training courses, the OTPD courses consist of: completion of a pre- and post-survey, course readings, synchronous and asynchronous discussion, written assignments and a final project. The OTPD courses are designed such that the course begins as facilitator centered and progressively transfers the responsibility from facilitators to teachers. Ultimately the OTPD course becomes a teacher-centered course.

eLearning for Educators is different from the TPD programs that have been examined to date. It is grounded in the research on effective online learning like many

OTPD programs, but it also addresses the research on the importance of training to facilitate online and responds to that research by requiring a facilitator-training course.

Data Sources and Data Collection

All of the data used in this study were collected using psychometrically sound survey instruments. The development of the surveys was guided by literature reviews and consultation with experts in the field of facilitator training, teacher professional development, and distance education. The development process was iterative and once the surveys were developed, validity was established by reviews from assessment and test construction experts and feedback from the first round of individuals who received the survey. The first round of facilitator and teacher participants who completed the surveys and consultations advised the removal and rewriting of some of the items on the surveys. Reliability of the surveys was established using Cronbach's alpha. Psychometric properties of the scales in the surveys were established using Cronbach's alpha as well as a principal components analysis.

Data collection using finalized surveys began in June 2006. Codes for online data collection were written using ColdFusion; an online data collection process, using the Corvus system, was employed. All raw data were housed on a Corvus server before being cleaned and uploaded into SPSS. All merging techniques and analyses were conducted using SPSS 16.0.

Instruments

Table 1.
Instruments Used in Data Collection

Instruments	
Facilitator Pre Survey	Survey used to determine a base measure for understanding and perceptions before the Facilitator Training workshop
Facilitator Post Survey	Survey used to measure perceived training course quality and knowledge following completion of the Facilitator Training Workshop
Teacher Pre Survey	Survey used to determine a base for teacher understandings and perceptions before the OTPD workshop
Teacher Post Survey	Survey used to measure perceived training course quality and knowledge following completion of the OTPD workshop
Teacher Six Month Out Follow Up Survey	Survey used to measure perceptions six months after completing the OTPD workshop also used to measure implementation and perceived student benefits.

Facilitator Trainee Pre- and Post-Surveys

Facilitators were required to complete a survey prior to beginning the facilitator training program and upon completion of the facilitator training program. The surveys were designed to gather information on background characteristics and demographics, as well as to measure the effectiveness of course components by collecting information on changes in: facilitator beliefs about online learning, level of preparedness to facilitate an OTPD course, understanding of the skills and best practices for delivering OTPD, and understanding implementation of technology in training. The surveys also asked facilitators to provide information on facilitator perception of course effectiveness and course components intended to prepare facilitators to run an OTPD course.

The facilitator pre-survey consists of 27 items. The survey contains: 5 demographic items, 8 background/experience items measuring facilitators' perception of their technology and training experience, 5 affective items measuring facilitators beliefs

about OTPD, 1 scale comprised of 14 items measuring facilitator perceived training needs, and 8 cognitive items addressing OTPD facilitation skills and best practices.

Pre-survey access was made available to facilitators in training two weeks prior to the training course start date and closed two weeks following the training course start date. A four week window was established by researchers to ensure the data were truly representative of pre-course information. When facilitator trainees registered to take the pre-survey they were provided with a username and password and a facilitator identification number was linked to their data.

The facilitator trainee post-survey is made up of 27 items: 4 items asking facilitators to provide information about the course they will be developing, 1 scale item asking facilitators to rate how prepared they perceive themselves to be in 13 aspects of OTPD facilitation, 3 items asking facilitators to indicate how ready they perceive they are to facilitate an OTPD course, 3 affective items asking facilitators to indicate how they feel about OTPD, 4 items asking facilitators to rate the quality of various components of the course, 1 scale asking participants to indicate how effective various components of the course were, 1 item asking facilitators to rate the overall quality of the course, 8 cognitive items identical to those on the pre-survey, and 1 open response item asking facilitators to provide any additional information about their experience in facilitator training.

Access to the facilitator post-survey was available to participants two weeks prior to the end date of the training course and closed two weeks following the end date of the course. A four-week window was determined to be optimal by the researchers as data collected prior to two weeks before the end of the course would not capture true training

course impacts, and data collected longer than two weeks following the course risked being confounded by effects realized after the program.

When logging in to the online data collection site to take the post-survey, facilitators entered the username and password provided when taking the pre-survey. This allowed post-survey data to be merged with pre-survey data in SPSS using the facilitator identification numbers.

When facilitators began delivering courses following training course completion, a unique cohort identification number identified each course so facilitator trainee survey responses could be merged into teacher survey responses in SPSS using a cohort identification number.

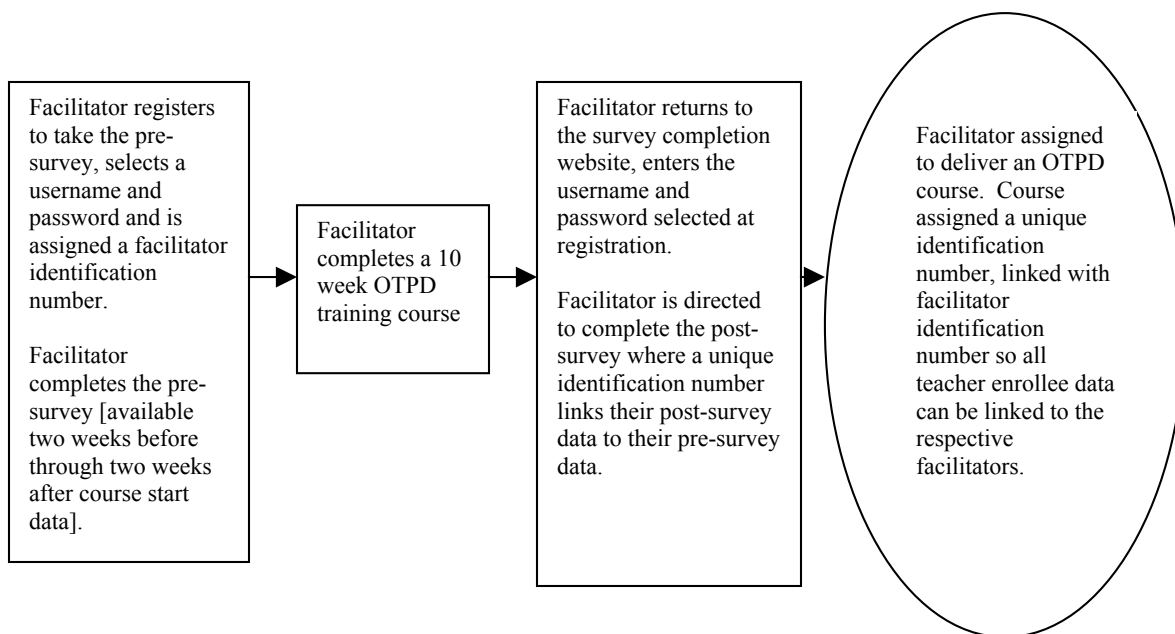


Figure 1: Facilitator Progression Through the eFE Program

Teacher PD Course Pre- and Post-Surveys

When a teacher enrolled in a course, she was provided a teacher identification number and directed to select the course name, facilitator name, and course start date.

These selections linked a cohort identification number to teacher survey response data allowing the researcher to merge teacher responses with facilitator responses by cohort identification number.

Teacher participants were directed to complete a pre-survey prior to beginning the OTPD course and upon completion of the course. The surveys were designed to gather information on teacher background and experience characteristics as well as measure pre-survey to post-survey changes in content knowledge, implementation strategies, and beliefs about online learning. The information gathered also provided information on teacher ratings of course quality and effectiveness.

The teacher participant pre-survey was made up of 23 items. The items consisted of 6 demographic and background items, 5 experience characteristics asking teachers about their teaching experience and experience with online learning, 5 items asking about teachers' school characteristics, 1 item asking about teachers how knowledgeable they are in the content of the course, 2 items asking teachers to indicate what they expect to gain from the course, 1 item asking whether the teacher expects to implement the PD in their classroom, 1 item asking what incentives the teacher will receive for taking the course (if any), 1 item asking how the teacher learns best, 1 item asking how proficient the teacher is in various online learning skills, 1 item asking teachers to indicate how they feel about online learning, and 1 item asking teachers to indicate how they learned about eLearning for Educators.

Pre-survey access was made available to teachers two weeks prior to the OTPD course start date and closed two weeks following the OTPD course start date. A four week window to complete the teacher pre-survey was established following the same

principles described in the facilitator pre-survey section. When teachers registered to take the pre-survey, they were provided with a username and password and a teacher identification number was linked to their data.

The teacher participant post-survey was made up of 34 items: 18 items ask teachers to rate various components of course quality, 2 items ask teachers to rate the effectiveness of the course, 1 background item, 3 items asking teachers to indicate characteristics of their school, 1 item asking about future enrollment, 3 affective items asking teachers to indicate how they feel about OTPD now that they have completed the course, 4 items asking teachers to rate the effectiveness of course facilitators, 2 items asking teachers to indicate their expectations of implementation, and 1 open response item asking teachers to provide any additional information they feel would be useful.

Post-survey access was made available to teachers two weeks prior to the OTPD course stop date and closed two weeks following the OTPD course stop date. A four week window to complete the post-survey was established following the same principles described in the facilitator post-survey section.

Teacher identification numbers were used to merge the teacher post-survey data with the teacher pre-survey data. Cohort identification numbers were then used to merge teacher survey response data with their respective facilitator's survey response data.

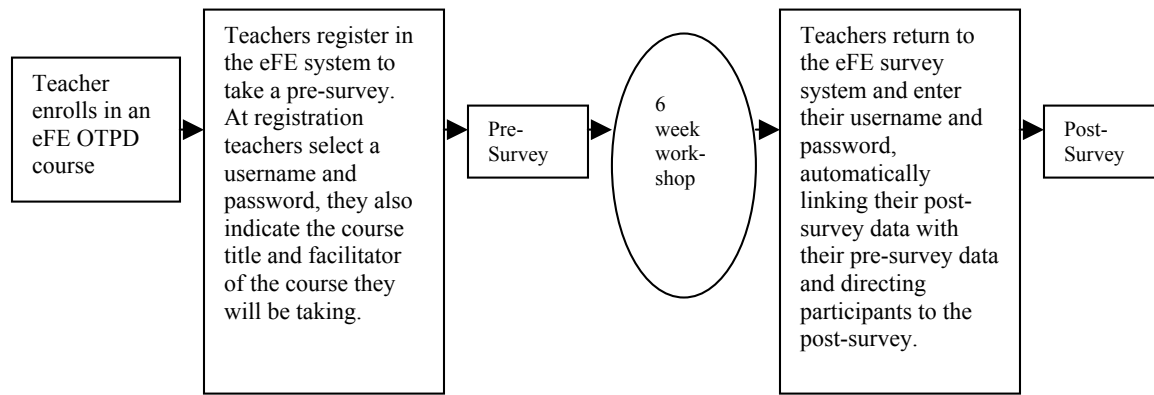


Figure 2: Progression for Teacher Participants Taking OTPD courses

Teacher 6 Month Out Follow-Up Survey

A random sample of teacher participants were selected to complete a follow up survey six months after successful completion of an eLearning course in an effort to measure teacher implementation and teacher perceived student impacts. Teachers were sampled three times and the percent of teachers sampled ranged from 40% to 100%. Between June 2006 and June 2008 three rounds of follow-up survey data were collected. Chosen participants were sent an email explaining the importance of collecting these data and provided with a link to the follow-up survey. The hyperlink directly connected their survey responses to their teacher identification number assigned to them when they enrolled in an eLearning course eight months earlier. Two weeks after the first email was sent out a reminder email was delivered to all participants who had not yet completed the follow-up survey. Finally, two weeks following that email a third email was sent out to teachers who had still not completed the follow-up survey. Every effort was made to contact non-respondents, including using alternate email addresses and asking individual state coordinators to contact the participants in their state who had been selected to complete a follow-up survey and ask them to complete survey.

After each round of data collection, follow-up survey data were linked to participants' pre- and post-survey responses. Responses were linked in SPSS by merging the data using the teacher identification numbers.

The follow-up survey consists of 20 items. One item asks participants to indicate how knowledgeable they are in the content area of the course that they completed. Four items ask participants to indicate the degree to which the course content fit with their school and classroom goals. One scale item asked teachers to rate how well the course prepared them to address various classroom needs. One item asked teachers to indicate areas of course improvement. One item asked teachers to indicate what additional support they could have needed. Teachers were also asked to indicate what area of classroom instruction improved most as a result of taking the course. Two items asked teachers about the extent to which they had shared the course content in their school or district. One item asked teachers if they had implemented the course content in their classroom. If the content had been implemented, the next eight items asked teachers about the effects of classroom implementation on student achievement.

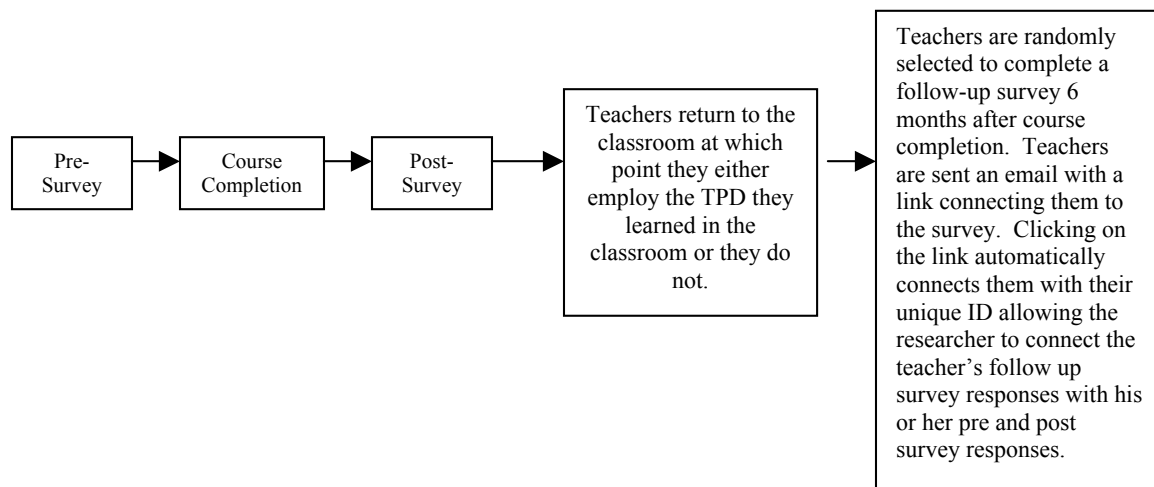


Figure 3: Progress of a Teacher Selected to Complete a Follow-Up Survey

Approach to Testing Each Research Hypothesis

The nature of these data lends them to nesting, since teachers are nested within facilitators. As there are multiple levels in the analysis, the first approach to testing each research hypothesis would be a Multi-level Model. Prior to concluding whether to run a single, or multi-level model, I propose to construct an Unconditional Multi-level Model. This model is a “null” model, because there are no predictors included in either the first or second levels of the model, there is only one random effect. It is equivalent to the one-way ANOVA with random effects, and simply serves as a first step in a Multi-level analysis and a baseline by which to evaluate subsequent models. The “null” model will serve, in this analysis, to calculate the intraclass correlation coefficient as well as test whether τ_{00} is statistically significantly different from zero.

The statistical model for the unconditional model is $Y_{ij} = \gamma_{00} + r_{ij} + u_{0j}$ where;

- Y_{ij} , the level one intercept, the mean quality rating for all J cohorts, is predicted at the level-2 with a single parameter, the level-2 intercept, γ_{00} , the grand mean for the population.
- γ_{00} is the grand mean the outcome variables in the population
- r_{ij} , is the error associated with the participants. It is the individual level random effect, assumed to be normally distributed with a mean of 0 and a variance σ^2
- u_{0j} is the error associated with each cohort (or the random between cohort effect). The cohort level random effect is also assumed to be normally distributed with a mean of zero, and a variance τ_{00} .

The intraclass correlation coefficient, (ICC) or $r = s^2_b / (s^2_b + s^2_w)$ which will be obtained through this analysis will show the proportion of variance that is between

cohorts. If the ICC=0, no correlation among participants within a cohort exists. As the ICC approaches 1, the responses within cohorts become more alike.

I propose to also use the results from this analysis to test whether the variability in the cohort intercepts is statistically significantly different from 0, that is whether all cohorts have an identical mean. To determine cohort intercept variability the tau statistic is tested.

$$H_0 : \tau_{00} = 0$$

$$H_1 : \tau_{00} \neq 0$$

I propose to use these results to determine whether there are significant differences between cohorts in outcome variables of interest that warrant modeling between-cohort effects. Generally, if there is an intraclass correlation coefficient that is greater than zero and the estimated value of tau is statistically significantly different from zero at the .05 level, a Multi-level model should be employed.

Researchers also note, however, that it is important to consider practical significance of analyses as well. If an extremely small amount of the variability in the outcome variable is attributable to nesting in the data, even if tau is determined to be statistically significant, it is not beneficial to use a multi-level model. Analyses of multilevel models are much more complex and the results of the analyses are difficult to interpret and communicate. Therefore, if the unconditional model indicates that less than 10% of the variance is attributable to teachers being nested within facilitators, only teacher level models will be used.

Methods Employed if the Intraclass Correlation is Greater Than 10%

Multi-level models will be used to test the research questions in this dissertation if the intraclass correlation coefficient is greater than .10. The identification variable for

each analysis will be “cohort” because teachers are nested within cohorts in this study. After facilitators are trained to facilitate an OTPD workshop they are then assigned to one of a variety of OTPD courses. Each course is broken into a number of cohorts across participating states. The number of cohorts in each state varies. There are many contextual differences between cohorts. Some of these differences, for example, include number of teachers, academic and experience level of teachers, and facilitator interaction with participants.

When conducting research the variables of interest must be meaningful and interpretable so that statistical results can be related to theoretical concern. The proper interpretation of hierarchical linear modeling results is linked to the choice of centering for the Level-1 predictor variables that produce the outcome measure for the Level-2 regression analysis. One primarily centers predictors in an effort to allow intercepts to vary between groups (in the case of this research, cohorts). The researcher can center around different variables. The deviation score obtained can either be the deviation from the group mean or from the grand mean. There are two other options when centering a variable, X-metric or user defined – these methods are used less generally, are not appropriate for this research, and will thus not be focused on in this proposal.

Testing the Research Questions

Approach

The models that will be used to test this research question will be the Means-As-Outcomes Regression model, the One-Way ANCOVA with Random Effect model, the Random Coefficients Regression Model, Intercepts and Slopes-as-Outcomes model, and the Non-Randomly Varying Slopes Model.

The nature of multi-level modeling is making choices to determine which model is the best fit. The approach to the multi-level models proposed for this dissertation is to begin with the base model presented in the introduction (the Unconditional Model) and compare increasingly more complex models to the base model. I will be comparing the percentage of variance explained by the level 1 predictor variables and level 2 contextual variables.

Decisions about variable centering must be made as well. Centering will minimize the covariances between the random intercepts and slopes. The difference between grand and group mean centering is the extent to which this minimization occurs. There are differing opinions on whether to use grand or group mean centering. Kreeft and deLeeuw (year?) indicate that grand and group-mean centering provide essentially the same results, which in some cases can be true. The results will differ the most, however, when the between-group variation of the mean of the predictor differs most. Different estimates for the intercept variance may be produced depending on how closely group means resemble the grand mean.

There has been little research about which method to use in areas where the theoretical background is weak. It is difficult, therefore, to know for certain which method should be employed. Grand mean centering is a simple linear transformation and the scores resulting from the group mean centering method are a non-linear function of two variables. Group mean centering minimizes the covariances among the random intercepts and slopes as well as minimizes bias in estimating the variances of the random components more than is seen in grand mean centering. Group mean centering, therefore, will have a greater effect on a multi-level modeling than grand mean centering.

Raudenbush and Bryk (2002) suggest using group-mean centering over grand-mean centering for these reasons.

Variables in these models will be centered around the group mean. By centering around the group mean, the intercept becomes the cohort mean. For example, if a variable “teacher experience with OTPD” is centered around the group mean, I will be centering around a different value in each cohort. The result is a new variable rather than just a rescaled predictor variable. The intercept then represents the unadjusted outcome measure for a teacher in cohort j . I will then be able to analyze the sampling distribution of cohort means around a population mean value.

Level-1 model:
$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - \bar{X}_{\cdot j}) + r_{ij}$$

Level-2 model:
$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

β_{0j} = expected outcome for a participant in cohort j who has a value of $\square_{\cdot j}$ on X_{ij}

Therefore, $\beta_{0j} = \mu_{Yj}$ (unadjusted mean for cohort j)

Group mean centering removes the group effect and only person level effects will be estimated. The Level-1 and Level-2 effects will be orthogonal to each other. The contextual effect is derived by subtraction. To look at the contextual effects, I will create new Level-2 variables – these variables will be the group mean values for the level-1 group mean centered variables.

Group-mean centering
$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - \square_{\cdot j}) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\square_{\cdot j} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

γ_{01} = cohort-level effect (between)

γ_{10} = participant-level effects (within)

$\gamma_{01} - \gamma_{10}$ = contextual effects

Models

Means-As-Outcomes Regression Model

In this model I will be adding level 2 independent variables to the unconditional model (presented in the introduction). This will allow me to predict the variability in the level 1 intercept using level 2 variables. No level 1 variables will be included in this model.

$$Y_{ij} = \beta_{0j} + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j}$$

The total model will look like:

$$Y_{ij} = \gamma_{00} + \gamma_{01}W_j + u_{0j} + r_{ij} \text{ note, as this is a representation of the general model used}$$

in each of the research questions the variables are not represented as being centered.

With the inclusion of contextual variables the level 2 error has now become a residual.

$$u_{0j} = \beta_{0j} - \gamma_{00} - \gamma_{01}W_j \text{ where;}$$

γ_{00} = the mean outcome when $W_j = 0$

γ_{01} = the slope associated with the level-2 predictor W_j

The variance of u_{0j} (τ_{00}) is the residual variance in β_{0j} after controlling for W_j .

For the fixed effects, I will test the hypothesis that the effect of the level 2 predictor is null:

$$H_0 : \gamma_{01} = 0$$

$$H_1 : \gamma_{01} \neq 0$$

For the random effects, I will test the hypotheses that:

(1) the residual variation between cohorts = 0

$$H_0 : \tau_{00_{RESID}} = 0$$

$$H_1 : \tau_{00_{RESID}} \neq 0$$

(2) the residual variation within cohorts = 0

$$H_0 : \sigma^2_{RESID} = 0$$

$$H_1 : \sigma^2_{RESID} \neq 0$$

This model will allow me to determine if mean workshop quality rating varies once I have controlled for cohort level predictors. To test this question, I will test whether the variability between cohorts is statistically significantly different from 0 after controlling for cohort level predictors. If $p < .05$, then I will conclude that after controlling for level two predictors, there is significant variation among the cohorts that remains to be explained. I will use my results from this analysis to determine my *conditional* intraclass correlation coefficient.

One-Way ANCOVA with Random Effects

In this model I will have teacher level (level 1) predictors with associated slopes. In the level 2 model I will allow the level 1 intercept to vary across cohorts but I will not be predicting the level 1 slopes nor will I allow the level 1 slopes to vary across cohorts.

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - \bar{X}_j) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

The full model is as follows:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + r_{ij} + u_{0j} \text{ here, the cohort effect is random rather than fixed.}$$

For the fixed effects, I will test the hypothesis:

$$H_0 : \gamma_{10} = 0$$

$$H_1 : \gamma_{10} \neq 0$$

That is, the effect of the level-1 predictor (X_{ij}) on Y_{ij} is null

For the random effects I will test the hypotheses:

(1) that the residual variation *between* cohorts = 0 (this should not change from unconditional model)

$$H_0 : \tau_{00_{RESID}} = 0$$

$$H_1 : \tau_{00_{RESID}} \neq 0$$

(2) that the residual variation *within* cohorts = 0

$$H_0 : \sigma^2_{RESID} = 0$$

$$H_1 : \sigma^2_{RESID} \neq 0$$

This model will allow me to determine whether the random components vary across cohorts; to determine this I propose to use the unstructured approach advocated by Bickel (2007,p 93).

In the previous model proposed, I constrained the regression slope so that all of the cohorts had the same Level-2 units. In this model, however, I will be allowing the slopes to vary over the population of the cohorts.

The model looks like:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(X_{ij} - \bar{X}_{\cdot j}) + u_{1j}(X_{ij} - \bar{X}_{\cdot j}) + u_{0j} + r_{ij} \text{ where;}$$

- γ_{00} = average intercept across the level-2 units.
- u_{0j} = unique increment to the intercept associated with the level-2 unit, j.
- γ_{10} = average regression slope across the level-2 units.
- u_{1j} = unique increment to the slope associated with the level-2 unit, j.

$$Y_{ij} = \underbrace{\left[\gamma_{00} + \gamma_{10}(X_{ij} - \bar{X}_{\cdot j}) \right]}_{\text{Fixed Piece}} + \underbrace{\left[u_{1j}(X_{ij} - \bar{X}_{\cdot j}) + u_{0j} + r_{ij} \right]}_{\text{Random Pieces}}$$

The two sets of random Level-2 effects that we have each have variation and they covary.

$$\text{Var} \begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} = \begin{bmatrix} \hat{\tau}_{00} & \hat{\tau}_{01} \\ \hat{\tau}_{10} & \hat{\tau}_{11} \end{bmatrix}$$

- $\text{Var}(u_{1j}) = \tau_{11}$ = unconditional variance in level-1 slopes, $\text{Var}(\beta_{1j})$
- $\text{Var}(u_{0j}) = \tau_{00}$ = unconditional variance in level-1 intercepts, $\text{Var}(\beta_{0j})$
- $\text{Covar}(u_{0j}, u_{1j}) = \tau_{01}$ = unconditional covariance in level-1 intercepts and slopes

This model is important because it guides the specification of the Level-1 Model and it gives useful statistics about the Level-2 variance structure.

The results of the HLM output provide reliability estimates that indicate the extent of reliability of each cohort's intercept and slope for estimating population parameters. The precision of the regression equation depends on two things; the number of teachers within each cohort and the variability of the variables within each cohort. Greater variability leads to more precise estimations of the intercept.

I will then determine if there is significant variation among the slopes associated with the predictor variables that warrant further modeling at level 2. To do so I would test:

$$H_0 : \tau_{00} = 0$$

$$H_1 : \tau_{00} \neq 0$$

The results from this test will determine whether the slopes should remain fixed or be permitted to vary in the analysis.

Random Effects Regression Model

To this point I have proposed only models with random intercepts. The next multi-level model I propose is the random coefficient regression model. In this model I will let the slope vary but I will not be predicting the variation in the slopes. This model

is necessary in multi-level modeling because it will guide the final specification of my level 1 models and it will provide useful statistics about the level 2 variance structure.

I will enter the teacher, cohort centered variables at level 1. I will examine the reliability of the estimates. This will show me, on average, how reliable each cohort's intercept and slope are for estimating the population parameters. If I determine that the reliability of a random level 1 coefficient is below .05 it will be fixed or allowed to vary non-randomly (Raudenbush and Bryk. 2002).

I will test the hypothesis for the fixed effects that, on average, the teacher level variables are not related to the outcome variables within cohorts. I will also examine the variance components.

Intercepts and Slopes-as-Outcomes model

In the next model I propose to construct I will attempt to predict the variability in the teacher level intercepts and slopes using contextual variables. I will be predicting outcome variables using cohort level variables. This model is necessary because it will allow me to look at how contextual characteristics are associated with individual outcomes.

After building this model I will examine the reliability of the intercepts and the slopes. I will then examine the fixed effects of the model. From examining the reliability and fixed effects I will be able to determine whether contextual variables are significant predictors of the level 1 intercept. I will also be able to determine whether contextual variables predict the within cohort regression slopes. For example, I will be able to determine whether cohort 10 differs from cohort 11 in terms of the strength of the relationship between facilitator rating of the training workshop and teacher rating of

workshop quality within cohorts after controlling for cohort mean teacher level of OTPD experience.

I will also examine the random components to determine how much variation in the slopes and intercepts has been explained. Therefore, I will be able to determine whether the residual variation in the intercepts and slopes decreased when the contextual variables were included.

If the results from this model indicate that there is very little (non-significant) variation in the level 1 slope after controlling for contextual variables I will be able to justify fixing the level 2 slopes equation. Therefore, after controlling for the contextual level variables, if I have found that there is no variation in the slopes left to explain, I will be eliminating the variability and covariance. The final model I would build would allow the slopes to vary from cohort to cohort but they would be varying non-randomly.

It can be challenging to determine whether to allow the slopes to vary randomly or to allow the slopes to vary only as a function of the contextual variables. To make this determination I will compare the fits of the two models. If the fit is better in the more complex model, I will move forward with the more complex model. If there is no significant difference between the fits of the two models I will move forward with the simpler model, because the results are more easily interpreted and communicated. When the model is shown to be specified appropriately, I will interpret the results of the multi-level model.

I propose to use the same multi-level model analysis for each of the additional research questions if the intraclass correlation coefficient is greater than 10%. Should the

resulting intraclass correlation coefficient be less than 10% I will proceed with the single level analyses described in the following section.

Methods Employed if the Intraclass Correlation is Less Than 10%

The chosen approach to testing each research question in this study if the intraclass correlation coefficient its less than 10% is outlined in Table 2. The table presents each research question, sample restrictions, sample size, variables, and method of analysis. Each method is discussed in detail following the table.

Table 2.
Method For Testing Each Research Hypothesis

Testing the Research Hypotheses				
Research Question	Sample Restrictions	Sample Size	Variables	Analysis
1 Rating of Workshop Quality	Pre/Post	8,560	Outcome: Teacher rating of overall workshop quality Predictor: Facilitator rating of training workshop quality, Facilitator Readiness Scale, Facilitator Preparedness Scale, Facilitator Effectiveness Scale. Control: Facilitator experience teaching OTPD, Facilitator experience with online learning, teacher experience with online learning, teacher experience with PD content.	Multiple Regression
2 Workshop Completion	Pre	11,532	Outcome: Teacher likelihood of workshop completion Predictor: Facilitator rating of training workshop quality, Facilitator Readiness Scale, Facilitator Preparedness Scale, Facilitator Effectiveness Scale.	Logistic Regression
3 Likelihood of Imp.	Pre/Post/Follow Up	917	Outcome: Teacher likelihood of TPD implementation Predictor: Facilitator rating of training workshop quality, Facilitator Readiness Scale, Facilitator Preparedness Scale, Facilitator Effectiveness Scale. Control: Whether the teachers' school promotes the use of this particular TPD.	Logistic Regression
4 Student Impacts	Pre/Post/Follow Up/Imp	683	Outcome: Teacher perceived student impacts Predictor: Facilitator rating of training workshop quality, Facilitator Readiness Scale, Facilitator Preparedness Scale, Facilitator Effectiveness Scale. Control: Teacher experience with OTPD, teacher experience with TPD content.	Multiple Regression
5 Future Enrollment	Pre/Post	8,560	Outcome: Teacher likelihood of future enrollment Predictor: Facilitator rating of training workshop quality, Facilitator Readiness Scale, Facilitator Preparedness Scale, Facilitator Effectiveness Scale.	Multiple Regression

Research Question 1: Predicting Teacher Ratings of Course Quality

Research Question

To what extent are facilitators' self-reported ratings of training effectiveness related to teacher perceptions of course quality above and beyond the effect that teacher and facilitator background characteristics have? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will be positively related to teacher perceptions of OTPD quality after controlling for facilitator and teacher experience characteristics.

Population and Sample Size

The target population in this study is all teachers who self-select into an eFE OTPD course or a state developed eFE OTPD course. The sampling frame begins with all teachers who enrolled in an eLearning for Educators course between June 2006 and June 2008. There are restrictions to this sampling frame, however. First, only teachers in courses delivered by facilitators who had completed a training course pre and post survey were included in the sample (facilitator $n=280$). Although survey completion was a requirement of the facilitator-training course, a 100% response rate was not achieved. Survey data are necessary for examining program effects, therefore if a facilitator did not complete both the pre- and post-survey, any teacher enrolled in one of his or her courses was removed from the sampling frame.

This sampling frame is further restricted because only teachers who completed both a pre- and post-survey were included. Although survey completion is a requirement of the OTPD course, a 100% response rate was not reached. Background, demographic, and experience data of participants who completed the pre, but not the post-survey is

available and will be analyzed. Information on completers and non-completers will be compared to determine if there is some systematic difference between the groups. Only data collected from participants who had completed the pre- and post-survey were used because to test this research question's hypothesis, outcome information is needed. Outcome information can only be gathered on the post-survey. When the complete data set was restricted only to teachers who had completed both the pre- and post-survey, 8,560 cases remained in the dataset and will be used for the analysis.

Research question 1 seeks to examine the extent to which facilitators' self-reported ratings of training effectiveness are related to teacher perceptions of course quality above and beyond the effect that teacher and facilitator background characteristics have on the relationship. The hypothesis is that higher facilitator self-reported ratings of training effectiveness will be positively related to teacher perceptions of OTPD quality after controlling for facilitator and teacher experience characteristics. To test this hypothesis, a multiple regression analysis will be employed. According to Tabachnick and Fidell (2001 p.117), a general rule of thumb for testing regression coefficients is to have a sample size that is greater than or equal to 104 plus the number of independent variables in the analysis. In this analysis 8 predictor variables will be included in the model; 4 control variables and 4 variables being tested. The rule of thumb implies a sample size of 112 ($104 + 8$).

Although my sample size exceeds that suggested by this rule of thumb, a power analysis should also inform the sample size. Therefore, to further establish sufficient power in this analysis, a power analysis using G*Power 3.0 software was conducted. G*Power indicates that when conducting a multiple regression analysis with 8 predictors

in order to detect an effect size of .20², given a conventional alpha level of .05, and a desired power of .80, a sample of at least 89 teachers is needed. As noted, a sample of 8,560 teachers well exceeds the necessary sample determined in the power analysis. My sample size, therefore, exceeds both the rule of thumb in the literature as well as that indicated by the power analysis.

Variables

Outcome variable: Teacher rating of course quality. As the research question attempts to test whether teacher ratings of course quality are related to facilitator training effectiveness ratings, teacher ratings were used as the outcome variable. A single item on the teacher post-survey asked teachers to rate the overall OTPD course quality. Teachers were asked to select from: “Excellent”=5, “Very Good”=4, “Good”=3, “Fair”=2, “Poor”=1. The mean of this item is 4.4, $SD=.705$ ($n=8,560$).

Predictor variables: The predictor variables include: facilitator rating of overall course quality, facilitator rating of preparedness to facilitate an OTPD course, facilitator rating of readiness to facilitate OTPD course, and facilitator rating of course effectiveness. These ratings were selected as predictor variables, because they each measure how well a facilitator perceives the training course prepared them to teach an OTPD course - the goal of the training course. Each of the predictor variables is a scaled variable composed of a set of items that all measure the same latent variable. The scales are each made up of facilitator ratings of course components shown in the literature to be necessary to deliver an effective OTPD course.

² A conservative effect size is being used because there is not precedent in the literature for effect size measuring facilitator training course effectiveness.

The first predictor variable, facilitator rating of overall course quality, is one item on the post-survey that asks facilitators to rate the overall quality of the training course. Facilitators were asked to choose from; “Excellent”=5, “Very Good”=4, “Good”=3, “Fair”=2, “Poor”=1. The mean rating of this item was 4.6, $SD=.54$ ($n=8650$).

Each of the other predictor variables is a scale variable created by combining several items into one over-arching item. Scale analyses and statistics were run on each of the separate scales to determine the reliability and validity of the scale. High reliability and validity indicate that the items in the scale are each measuring the same latent variable. Responses from all facilitators in the facilitator trainee data set were used and reliability and principal components analyses (PCA) were run on each of the scales.

The scale statistics presented include the mean and variance of each individual item, the overall reliability (alpha) of the scale and the alpha if the item is deleted. A depressed alpha, if the item is deleted, is desirable as it shows that the item is contributing to the reliability of the scale. The corrected item total correlation is presented as well. It is desirable to have each item highly correlated with the scale, as this indicates that response patterns are consistent within the scale.

The PCA presents factor loadings and the percent of variance explained. It is desirable for items to have high factor loadings on one factor; this indicates a strong and unidimensional scale. If an item loads weakly on one factor, it indicates that the item poorly represents the scale. When an item displays high loadings on several factors, it indicates that more than one construct is being measured by the item; thus the unidimensionality of the scale is questionable. It is desirable to have a large percentage

of the variance explained by the items. A low percentage of variance explained indicates that there are other non-measured variables that are influencing the construct of interest.

Scales Analyzed

Scale 1: Preparedness scale. Thirteen items on the post-survey asked facilitator trainees to indicate their level of preparedness to perform tasks associated with effective OTPD facilitation. Facilitators were asked to rate their level of preparedness by indicating one of four levels of preparedness; “Very Prepared”=4, “Prepared”=3, “Unprepared, I need some additional training or support”= 2, “Very Unprepared, I need significant additional training or support”=1. Facilitators were asked to rate their level of preparedness in each of the following areas:

- a.) fostering communication between course participants
- b.) using primarily written forms of communication
- c.) handling low levels of participation
- d.) tracking the participation of course participants
- e.) judging the quality of online discussion
- f.) responding thoughtfully to participant postings
- g.) creating a supportive online environment
- h.) fostering an active online learning environment
- i.) assisting with participants technical difficulties
- j.) using a course management system (e.g. Blackboard)
- k.) responding to participant questions about the content of a course
- l.) setting clear expectations of participants
- m.) evaluating participant work

Table 3.
Scale Statistics for Items on Preparedness Scale

Scale Statistics for Items on Preparedness Scale				
	Mean	St. Dev.	Corr Item Total R	Alpha if Del.
Fostering communication	3.69	0.46	0.65	0.89
Using primarily written forms of communication	3.75	0.44	0.60	0.89
Handling low levels of participation	3.54	0.53	0.62	0.89
Tracking participation	3.58	0.57	0.57	0.90
Judging the quality of online discussion	3.54	0.55	0.68	0.89
Responding thoughtfully to postings	3.70	0.47	0.68	0.89
Creating a supportive onlien environment	3.68	0.48	0.66	0.89
Fostering an active online learning environment	3.64	0.50	0.70	0.89
Assisting with participants' technical difficulties	3.15	0.70	0.43	0.91
Using a course management system	3.49	0.56	0.54	0.90
Responding to questions about content	3.59	0.53	0.62	0.89
Setting clear expectations	3.75	0.44	0.64	0.89
Evaluating participants' work	3.56	0.54	0.67	0.89
n=280, Alpha=.90				

As indicated in Table 3 the scale on the post-survey measuring facilitator perceived level of preparedness to facilitate an OTPD course has strong psychometric properties. There is a high alpha (.90). All except one item contribute to the overall alpha and “assisting with participants’ technical difficulties” the one item that, if removed, would inflate the overall alpha is trivial and can remain included. Further, the majority of the items have a strong ($>.60$) correlation between the items and the scale score.

Table 4.
Factor Loadings for Items on Preparedness Scale

Factor Loadings for Items on Preparedness Scale	
	Factor 1
Creating a supportive online environment	0.71
Fostering an active online learning environment	0.74
Judging the quality of online discussion	0.71
Setting clear expectations	0.70
Evaluating participants' work	0.72
Tracking participation	0.57
Responding thoughtfully to postings	0.74
Responding to questions about content	0.66
Handling low levels of participation	0.65
Fostering communication	0.70
Using primarily written forms of communication	0.65
Using a course management system	0.53
Assisting with participants' technical difficulties	0.42
% Variance Explained	44

As indicated in Table 4 the post-survey scale for measuring facilitator trainee’s level of preparedness to facilitate an OTPD course is strongly unidimensional and all items load strongly on a single factor. One factor accounts for 44% of the variance. Therefore, although a large proportion of the variance is accounted for by the principal factors, there may be some unmeasured factor accounting for some variance.

Scale 2: Readiness Scale

Three items on the post-survey asked facilitators to indicate their perceived level of readiness to facilitate an OTPD course. Trainees were asked to respond to each question by indicating the degree to which they agreed with each statement. Response options included: “Strongly Agree”=4, “Agree”=3, “Disagree”=2, “Strongly Disagree”=1. The statements were:

- a.) I am ready to facilitate an online course.
- b.) I am familiar with the basic techniques for facilitating an effective online course.
- c.) I have a clear understanding of my responsibilities as a course facilitator.

Table 5.
Scale Statistics for Items on the Readiness Scale

Scale Statistics for Items on the Readiness Scale				
	Mean	St. Dev.	Corr. Item Total R	Alpha if Del.
I am ready to facilitate an online workshop.	3.69	0.49	0.70	0.77
I am familiar with the basic techniques for facilitating an effective online workshop	3.75	0.45	0.75	0.72
I have a clear understanding of my responsibilities as a workshop facilitator	3.74	0.45	0.82	0.64
<u>n</u> =280, Alpha=.84				

Scale statistics for the readiness scale indicate that the scale has strong psychometric properties. Each item positively contributes to Cronbach’s Alpha (.84), and there are strong (>.60) correlations with all items on the scale.

Table 6.
Factor Loadings for Items on the Readiness Scale

Factor Loadings for Items on the Readiness Scale	
	Factor 1
I am familiar with the basic techniques for facilitating an effective online workshop	0.88
I am ready to facilitate an online workshop.	0.80
I have a clear understanding of my responsibilities as a workshop facilitator	0.71
% Variance Explained	64

As indicated in Table 6, the post-survey readiness scale is strongly unidimensional. This is obvious by the high factor loadings of each item on a single factor, and the large percent of variance (64%) explained by the factor.

Scale 3: Course Effectiveness

On the post-survey, participants were asked to rate the level of effectiveness of a number of facets of the course. These particular components of the course were developed in accordance with the literature on areas facilitators should be trained in before delivering an OTPD course. Participants were asked to rate the effectiveness of the following facets using one of four response options: “Extremely Effective”=4, “Effective”=3, “Somewhat Effective”=2, “Not Effective”=1. The course components were:

- a.) Course facilitator modeling how to manage online discussion
- b.) Discussion topics
- c.) Required readings
- d.) Practice using a course management system
- e.) Asynchronous discussion
- f.) Course activities and assignments
- g.) Completing the course planning system

Table 7.
Scale Statistics for Items on the Effectiveness Scale

Scale Statistics for Effectiveness Scale				
	Mean	St. Dev.	Corr. Item Total R	Alpha if Del.
Course facilitator modeling	3.63	0.48	0.69	0.84
Discussion topics	3.68	0.47	0.75	0.83
Required readings	3.67	0.46	0.61	0.84
Practice using CMS	3.65	0.53	0.63	0.84
Asynchronous discussion	3.54	0.51	0.55	0.85
Course activities and assignments	3.67	0.49	0.77	0.83
Workshop planning guide	3.41	0.62	0.55	0.86
n=280, Alpha=0.86				

The overall scale had a high alpha (.86). All of the items contribute positively to the internal consistency of the scale and all have a moderate to high corrected item total correlation.

Table 8.
Factor Loadings for Items on the Effectiveness Scale

Factor Loadings for Effectiveness Scale	
	Factor 1
Course activities and assignments	0.84
Discussion topics	0.83
Course facilitator modeling	0.77
Required readings	0.66
Asynchronous discussion	0.60
Workshop planning guide	0.59
Practicing using CMS	0.57
% Variance Explained	45

As indicated by Table 8, the scale is unidimensional and accounts for 45% of the overall variance. Each of the scales used as predictor variables have strong psychometric properties, therefore the researcher has confidence that each scale measures the respective latent variable of interest.

Control Variables: Facilitator experience characteristics, teacher experience characteristics.

This research is interested in measuring the effect that the facilitator training course has on teacher ratings of overall course quality. There are, therefore, a number of experience characteristics that should be controlled for. The design intends to control for any variance accounted for by previous OTPD facilitator training or OTPD facilitation experience that a facilitator may have. The design further intends to control for any variance accounted for by teacher previous experience in online learning as well as previous experience with the TPD content of the course.

One item on the facilitator trainee pre-survey asks facilitators to indicate whether he or she has ever taken an online course or course. Facilitators are asked to select the item if they have taken an online course or course and leave it blank if they have not. If the facilitator selected the item the responses was coded with a “1” and if the facilitator did not select the item the responses was coded as system missing. The variable was recoded such that if the facilitator selected the item the responses was coded as “1” and if the facilitator did not select the item the response was coded as “0”. Another item on the facilitator pre-survey asks facilitators to indicate whether they have ever delivered an online course or course. Facilitators are asked to select the item if they have and leave the item unselected if they have not. The responses were recoded such that if the facilitator selected the item it was coded as zero.

Similarly, on the teacher pre-survey, teacher participants are asked to indicate whether they have ever taken a course or course that focused on the subject area of the course they are currently enrolled in. Teachers are asked to select the item if they have and leave it blank if they have not. The responses were recoded such that if a teacher selected the item it was coded as “1” and if the teacher left the item blank it was coded as “0” [tsm]. Finally, teachers are asked whether they had taken an online course or course in the past. Teachers are asked to select the item if they have taken an online course or course and leave it blank if they have not. The responses were recoded to “1” if selected and “0” if not [tow].

Analytic Procedures

To test the hypothesis in research question 1, a multiple regression analysis at the teacher level will be used. Multiple regression is a technique that is derived from the

General Linear Model (GLM). As the technique is derived from the GLM, it is a linear additive model that is stochastic rather than deterministic in that it predicts and includes error. Therefore the model can both be predictive or exploratory in that it both, attempts to find the relationship between some independent variables and a dependent variable, and maximize R^2 .

The main effects multiple regression equation constructed for this analysis takes the form:

$$TeachRating = a + b_1(fow) + b_2(fdw) + b_3(tsm) + b_4(tow) + b_5(fac_rate) + b_6(fac_prep) + b_7(fac_read) + b_8(fac_eff) + \text{where};$$

Teach_Rate is the teacher rating of overall course quality

“a” is the constant. This represents the value of teacher rating when all of the independent variables equal zero. This value includes the error term.

The “b’s” are the regression coefficients representing the amount that teacher rating of course quality changes when the corresponding independent variable changes one unit.³

When building a regression model (i.e selecting the most parsimonious set of variables that explain the variation in teacher rating of overall course quality), the choice of which method to use is that of the researcher. The model building in this analysis was guided by the theoretical understanding of the relationship among variables as well as the purposes of the analysis. I am interested in understanding the relationship between facilitator ratings of course effectiveness and teacher perceived course quality above and beyond the effect that facilitators or teachers previous experience might introduce. To achieve this, I will use a theory testing regression method. A theoretical guide will be

³ Regression coefficients highlighted are acting as controls and will be entered in the model first using forced entry.

used to determine entry of the variables into the model in this analysis. Such a procedure allows the researcher to select the order of entry based on theoretical guidelines.

The regression equation will determine the best fitting linear regression line to the data. This is achieved by finding the linear combination of predictor variables that maximizes the multiple correlation and minimizes the sum of the squared error terms (residuals) using the Least Squares Criterion. If the Least Squares Criterion and the assumptions of linear regression are met a Best Linear Unbiased Estimator is determined (BLUE).

To test the significance of the multiple regression of teacher rating of course quality on facilitator rating of training course quality, level of preparedness, level of readiness, and effectiveness rating a total of three tests will be conducted. The test of overall R^2 , a test of the regression coefficients, and the test of increments in the proportion of variance accounted for by a given variable.

When interpreting the analyses, beta weights will be used rather than raw score regression coefficients. Raw score regression coefficients are highly scale dependent, and my predictor variables are not measured on the same scale. Thus to assess their relative importance they would have to be converted into standardized regression coefficients. Standardization is achieved by dividing the raw score regression coefficients by their standard deviations.

Prior to interpreting the results of the regression equation, the researcher will conduct checks of whether the assumptions of Ordinary Least Squares Regression have been met. Ordinary Least Squares Regression assumptions include:

- (1) X is fixed and measured without error. If there is a substantial amount of measurement error the regression coefficients will be disattenuated. In this research the predictors are fixed and are assumed to be measured without error.
- (2) The relationship between the predictors and the criterion is linear. In the presence of curvilinear or cubic relationship the real relationship will be underestimated. The linear relationship will be tested initially upon analysis.
- (3) The error term distribution is normal and error variances are constant. If this assumption is violated a confidence interval cannot be placed around the regression line and the precision of my estimates will vary depending on the position on X. A residual analysis will be conducted with the presentation of the regression analysis.
- (4) Error terms are uncorrelated. If this assumption is violated the model is misspecified.

Other important checks that will be made include examination of missing data and outliers. If the data suffer from missing data, a method of mean score replacement within facilitators will be used to replace the missing data. Once the data are disaggregated by facilitator and mean teacher ratings are assigned to all teachers within respective facilitators, the same mean score will be assigned to teachers within that facilitator who have a missing score. Similarly, outliers in the data will be examined to determine the extent to which such data points affect the regression results and should they affect the results significantly their removal will be considered.

Research Question 2: Factors Influencing TPD Completion

Question

How is teachers' completion of an OTPD course influenced by facilitators' self-reported ratings of training effectiveness above and beyond the effect that school characteristics

have? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will increase the likelihood of teachers' completing their respective OTPD course after controlling for school characteristics.

Population and Sample Size

The target population in this study is all teachers who self-select into an eFE OTPD course or a state developed eFE OTPD course. The sampling frame begins with all teachers who enrolled in an eLearning for Educators course between June 2006 and June 2008 that were taught by a facilitator who had completed a pre- and post-training survey. The sample frame is further restricted, because teachers who did not complete a pre-survey were removed from the sampling frame. Although survey completion is a requirement of the course, a 100% response rate was not reached. Some information on non-respondents is available and was analyzed. Teachers who did not complete the post-survey are considered "non-completers."

These restrictions ultimately enable 11,532 teacher participants who enrolled in an OTPD course to be considered for examination of this research question, 8,560 completers and 3,948 non-completers. The general rule of thumb in logistic regression is that there should be at least 40 cases per candidate independent variable (Harrell 2001). In this description, cases represent the number of observations in the level of the binary outcome with fewer cases. As 4 predictor variables are being included in the model, the rule would indicate a minimum number of cases as 160. Larger sample sizes are required for logistic regression than linear regression because standard errors for maximum likelihood estimation are large-sample statistics. The level of the outcome with fewer

cases has an $n=3,948$ which easily meets the minimum number of cases. With 3,948 non-completers the sample is large enough to achieve power.

Variables

Outcome Variable: The binary variable [compl] is the outcome variable. This variable indicates whether or not a teacher participant completed the OTPD course he signed up for. Completion is measured by completion of the teacher OTPD post-survey (a requirement to receive credit for the course). If the teacher did complete the course post-survey, he or she is considered a ‘completer’ and if the teacher did not complete the post-survey, he or she is considered a ‘non-completer’.

Predictor Variables: Facilitator rating of overall course quality, facilitator preparedness scale, facilitator readiness scale, facilitator effectiveness scale⁴.

Analytic Procedures

This analysis seeks to determine the relationship between facilitator ratings of course effectiveness and teacher course completion to examine whether higher ratings of facilitator effectiveness lead to a greater probability of course completion. The analysis is therefore conducted on the teacher level.

Logistic regression is a statistical procedure used to estimate the relationship between one or more predictor variables and the likelihood that an individual is a member of a particular group. Essentially a logistic regression determines the probability that an observation belongs to one of two groups (Grimm & Yarnold, p.219) Through the use of a logistic regression, two separate probability values are obtained, one that a respondent belongs to a group denoted “1” and one probability that a respondent belongs to a group

⁴ Psychometric properties of these scales are discussed with the previous research question.

denoted “0”. The respondent is “placed” in the group having the higher predictive probability.

In this research question, predictor variables are being used to build a model that will accurately place teachers in either the “completer group”=1 or the “non-completer group”=0. Predictor variables can be either categorical or continuous; in this analysis all predictor variables are continuous. When a logistic regression is conducted, the coefficients of a formula to predict a logit transformation of a probability of group membership are generated.

The basic logistic regression model is:

$\text{Logit}(y) = b_0 + b_1X_1 + b_2X_2 + \dots + b_kX_k$ where y is the probability of group membership.

The logit transformation is defined as the log odds:

$P = \text{Odds} = \frac{\text{the probability of group membership}}{\text{the probability of absence of group membership}}$

and

$\text{logit}(y) = \ln(p/1-p)$

The logistic regression model for this analysis takes the form:

$\text{Logit}(\text{course completion}) = b_0 + b_1(\text{fac_rate}) + b_2(\text{fac_prep}) + b_3(\text{fac_read}) + b_4(\text{fac_eff})$

While a probability value ranges from 0 to 1, an odds value can range from 0 to infinity. The reason that an odds ratio is used rather than a probability ratio is because probability change is dependent upon the initial level of the predicted value while the estimated change in odds is the same for all levels of the predictor variable. The odds ratio estimates the change in the odds of membership in the target group for a one-unit increase in the predictor (Grimm & Yarnold, p.223).

As the relationship between the predictor and the predicted values is assumed to be nonlinear, it takes the shape of a sigmoid. The curve will never fall below 0 and will never reach above 1. As the independent variable increases, the probability increases up the curve, but then the slope starts decreasing so that at any level of the independent variable, the probability will approach 1 but never exceed it. Regression models cannot accommodate such a relationship as it is inherently non-linear. Also, the error term of a discrete variable follows a binomial distribution rather than a normal one, invalidating all statistical tests based on that assumption. Further, the variance of a dichotomous variable is not constant, creating heteroscedasticity. Logistic regression deals specifically with these issues.

It could be argued that a discriminant analysis could be used to test this research hypothesis. Discriminant analysis also used to predict membership in two or more mutually exclusive groups from a set of predictors. Discriminant analysis is essentially the inverse of a one-way multivariate analysis of variance. A discriminant analysis can be used for multiple categories in the dependent variable. This benefit is seen as an advantage over logistic regression, as logistic regression is always used for a dichotomous dependent variable. In this analysis however, the dependent variable is dichotomous and thus a logistic regression is proposed. A logistic regression is advantageous in this analysis for a number of reasons. First, it requires fewer assumptions and is less restrictive than discriminant analysis. It is particularly robust to violations in the assumption of normality of variables. Also, in a logistic regression predictive values can always be interpreted as probabilities of membership in the target group, while linear regression can give predicted values that are negative or greater than

1. Unlike linear regression there are no assumptions of linearity, homoscedasticity, or normality for the independent variables. Finally, logistic regression utilizes maximum likelihood techniques that maximize the value of the log-likelihood function, which indicates how likely it is to obtain the observed values of the outcome given the values of the dependent variables and the parameters.

In maximum likelihood estimation the researcher first assumes that the general form of the population distribution from which the sample is drawn is multivariate normally distributed. Population parameters, which give this distribution a particular form among all possible multivariate normal distributions, are not known, however. Arbitrary values can be assumed and treated as if they were the population parameters. The researcher then determines the values for the population parameters that will result in the greatest joint likelihood of the sample observations.. These values are the maximum likelihood estimators of the population parameters. Maximum likelihood estimation resorts to iterative algorithms requiring the use of a computer for their application. When the change in the likelihood function from one step to the next is negligible then the process converges.

To test for the significance of coefficients, logistic regression uses the Wald statistic instead of the t statistic. A classification analysis compares the number of respondents correctly classified with the number incorrectly classified. This table also allows for the examination of the percentage of a target group accurately classified, the percentage of the individuals that a model classifies as belonging to a target group that are actually in the non-target group, and negative predictive power.

When interpreting logistic regression coefficients it is important to note that the coefficients are actually measures of the changes in the ratio of probabilities, odds ratios. They are expressed in logarithms so they will need to be transformed back to odds.

Prior to interpreting the results of the analysis, certain assumptions must be tested.

- (1) The outcome variable (group membership status) must be dichotomous in nature and take the value 1 with probability P_1 and the value 0 with probability $P_0=1-P_1$.
- (2) Outcomes must be statistically independent, that is a single case can be represented in the data set only once. If they are not, standard errors, hypothesis tests, and confidence intervals may be inaccurate.
- (3) The model must be correctly specified, that is it contains all relevant predictors and no irrelevant predictors. If the model is misspecified the analysis will give incorrect estimates of population coefficients for variables in the model.
- (4) The outcome variable must be mutually exclusive and collectively exhaustive or estimates will be inaccurate.

The use of a logistic regression will allow this researcher to build a model to determine the probability that a teacher will complete the OTPD course and the probability that a teacher will not complete the OTPD course based on facilitator ratings of training course effectiveness. To that end the researcher will be able to determine whether changes in facilitator rating of training course effectiveness alter the likelihood that a teacher will complete an OTPD course.

Research Question 3: Factors Influencing TPD Implementation

Research Question

How is implementation of TPD content in a teachers' classroom influenced by facilitators' self-reported ratings of training effectiveness after controlling for school characteristics? My hypothesis is that higher facilitator self-reported ratings of training effectiveness will increase the likelihood of teachers implementing the learned PD content in their classroom above and beyond the effect that school characteristics have.

Population and Sample Size

The target population is all teachers who enroll in an eLearning for Educators OTPD course. The sampling frame begins with all teachers who enrolled in an eLearning for Educators course between June 2006 and June 2008 that were taught by a facilitator who had completed a pre- and post-training survey. The sample frame is further restricted because only teachers who completed a pre-survey, post-survey, and six month out follow-up survey were included.

These restrictions ultimately enable 917 teacher participants who enrolled in and successfully complete an OTPD course to be considered for this study. For research question 3, a logistic regression analysis will be used. Following the rule of thumb presented with Sample 1, when including 4 predictors in the model, a minimum of 160 cases are required in the smaller of the two outcome groups to achieve sufficient power. In this analysis, 638 teachers indicated that they had implemented the PD content into the classroom and 297 indicated that they had not. The number of cases in the rarer of the bivariate outcome is large enough to achieve sufficient power.

Variables

Outcome Variable: The outcome variable in the analysis is one variable that indicates whether the teacher participant has implemented the TPD content in her classroom within six months of course completion. The item is binary because the teacher either had implemented the material or had not implemented the material. One item on the six month out follow up survey asked teachers to indicate whether he or she had implemented the learned TPD content. Teachers were asked to select from, “Yes, I have already used this material with my class this year”=4, “Yes, I plan on using this material with my class this year”=3, “I probably won’t use this material with my class this year, but I may use it next year”=2, “No, I definitely won’t use this material with my class this year or next year”=1. If the teacher indicated that he or she had already implemented the TPD content in the classroom within six months of completing an OTPD course, the participant is considered an ‘implementer’ and if the teacher indicated that he or she had not yet implemented the TPD (even if he or she indicated that it may be used in the future), the participant is considered a ‘non-implementer’.

Predictor Variables: Facilitator rating of overall course quality, facilitator preparedness scale, facilitator readiness scale, facilitator effectiveness scale.

Analytic Procedures

A logistic regression will be used to test this research hypothesis. As was described in research question 2, a logistic regression is appropriate when there is a dichotomous outcome variable. In this case, whether or not a teacher has implemented the material in his or her classroom is the dichotomous outcome.

The statistical model in this analysis takes the form:

$$\text{Logit(TPD implementation)} = b_0 + b_1(\text{fac_rate}) + b_2(\text{fac_prep}) + b_3(\text{fac_read}) + b_4(\text{fac_eff})$$

$\text{Logit(TPD implementation)} = \ln(p/1-p)$

The odds ratio estimates the change in the odds of membership in the target group for a one-unit increase in the predictor (Grimm & Yarnold, p.223). To test for the significance of coefficients, the Wald statistic will be used. A classification analysis will compare the number of respondents correctly classified with the number incorrectly classified.

The use of a logistic regression will allow this researcher to build a model to determine the probability that a teacher will implement the learned TPD in the classroom and the probability that a teacher will not implement the learned TPD in the classroom. The researcher will then be able to determine whether changes in facilitator rating of training course effectiveness alter the likelihood that a teacher will implement the learned TPD in his or her classroom within six months of successful course completion.

Research Question 4: Predicting Teacher Perceived Student Achievement

Research Question

To what extent are facilitator ratings of training course effectiveness related to teacher reported ratings of student achievement after controlling for teacher experience characteristics? My hypothesis is that higher self-reported ratings of training course effectiveness will result in higher teacher reported ratings of student achievement above and beyond the effect that teacher characteristics have.

Population and Sample

The target population is all teachers who enrolled in an eLearning OTPD course. The sampling frame begins with all teachers who enrolled in an eLearning for Educators course between June 2006 and June 2008 that were taught by a facilitator who had

completed a pre- and post-training survey. The sample frame is further restricted, because only teachers who completed a pre-survey, post-survey, and six month out follow-up survey were included. Finally, the sampling frame was restricted because only teachers who had indicated that they had already implemented the material in the classroom were included. As this research question expects to determine the relationship between facilitator training and teacher perceived student impacts, only data collected from teachers who indicated that they had implemented the material was useful. This analysis was therefore conducted at the teacher participant level. These restrictions ultimately enable 638 teacher participants, taught by a total of 176 facilitators to be considered for this study.

To test the hypothesis in research question 4 a multiple regression analysis is employed. According to Tabachnick and Fidell (2001 p.117) a general rule of thumb for testing regression coefficients is to have a sample size that is greater than or equal to 104 plus the number of independent variables in the analysis. The required sample size for sufficient power, therefore, would be 112. Following this rule of thumb, my sample size also well exceeds that necessary to achieve power of .80.

To further ensure sufficient power, a power analysis conducted using G*Power 3.0 software indicates that when conducting a multiple regression analysis with 8 predictors (4 being tested and 4 controlling) in order to detect an effect size of .20 (a relatively conservative effect as there is no precedent in the literature for determining effect sizes for this type of analysis) given a conventional alpha level of .05, and a desired power of .80, a sample of at least 98 teachers is needed. Even after substantially reducing

my sample to include only teachers completing the follow-up survey, it still well exceeds the necessary sample size determined in the power analysis.

Variables

Outcome: The outcome variable in this analysis is a composite rating of teacher perceived student impacts. Six items on the teacher follow-up survey ask teachers to indicate the extent to which they agreed that students were positively impacted in a number of areas. The six items were:

- (a) Students appeared more interested in class when I used the course content/approaches
- (b) Students work together more cooperatively in the classes when I use the course content/approaches.
- (c) Students' diverse learning needs were addressed better in classes using the course content/approaches.
- (d) Students' showed better academic performance in the targeted content using the course content/approaches.
- (e) Students' products were of a higher quality in classes using the course contents/approaches.

Teachers were asked to select among: "Strongly Agree"=4, "Agree"=3, Disagree"=2, and "Strongly Disagree"=1, "Not Applicable"=0.

Combined these items made up the "student impacts" scale. Scale analyses and statistics were run on the scale to support the use of composite items. This is calculated by combining several items into one over-arching item. Responses from all teachers have been pooled and scale and principal components analyses (PCA) have been run on each of the scales.

Table 9.
Scale Statistics for Student Impact Items

Scale Statistics for Student Impact Items				
Item	Mean	St. Dev.	Corr. Item Total R	Alpha if Item Del.
Students appear more interested in the classes	3.06	0.83	0.65	0.84
Students exhibit greater cooperation	2.79	1.08	0.60	0.85
Diverse student learning needs are addressed better	3.00	0.86	0.59	0.85
Students show better academic performance	2.90	0.94	0.70	0.83
Students perform more difficult work	2.77	1.04	0.71	0.83
Student products are of higher quality	2.86	0.98	0.71	0.83
% Variance				
n=683 Alpha = .86				

As indicated in Table 9, the scale on the post-survey measuring facilitator perceived level of preparedness to facilitate an OTPD course has strong psychometric properties. There is a high alpha (.86). Each of the items positively contributed to the overall scale alpha. Further, the majority of the items have a moderately strong (>.60) correlation between the items and the scale score.

Also indicated in Table 9 is that the scale is unidimensional and accounts for 60% of the overall variance. Table 9 indicates that the student impact scale has strong psychometric properties and measure the latent variable. The items can therefore be combined into one overarching item that would take on a minimum value of zero and 24.

Control Variables: The control variables that will be used in this analysis are the facilitator and teacher experience characteristics described in the analysis of research question one. These variables included: whether a facilitator has taken an online course in the past, whether a facilitator has delivered an online course in the past, whether a

teacher has taken a course focused on this subject matter in the past, and whether a teacher has taken an online course in the past.

Analytic Procedures

To test the hypothesis in research question 4, a multiple regression analysis will be used. The analysis will determine differences between respondents based on naturally occurring relationships, or to determine statistically significant differences between groups based on statistically predicted scores.

A theory driven model will be used and variables will be forced into the model by the researcher as grounded in theory:

$$\text{TeachPerStImp} = a + b_1(\text{fow}) + b_2(\text{fdw}) + b_3(\text{tsm}) + b_4(\text{tow}) + b_5(\text{fac_rate}) + b_6(\text{fac_prep}) + b_7(\text{fac_read}) + b_8(\text{fac_eff}) + \text{where};$$

TeachPerStImp is the teacher rating of overall course quality

“a” is the constant, where the regression line intercepts the y axis. This represents the value of teacher perceived student impacts when all of the independent variables equal zero. This value includes the error term.

The “b’s” are the regression coefficients representing the amount that teacher perception of student impact changes when the corresponding independent variable changes one unit. The regression coefficients highlighted are control variables and those not highlighted are predictor variables being tested.

A multiple regression analysis will allow the researcher to determine the relationship between facilitator training effectiveness ratings and teachers’ perceptions of the impact that the OTPD is having on students in the classroom. This analysis will effectively test the research hypothesis and answer the research question.

Research Question 5: Predicting Future TPD Enrollment

Research Question

How is a teacher's future enrollment of OTPD influenced by facilitators' self-reported ratings of training effectiveness? My hypothesis is that higher facilitator self-reported ratings of training course effectiveness will increase the likelihood of teachers enrolling in a future OTPD course

Population and Sample

The population of interest is all teachers who enrolled in an eLearning OTPD course. The sampling frame begins with all teachers who enrolled in an eLearning for Educators course between June 2006 and June 2008 and were taught by a facilitator who had completed a pre- and post-training survey. This sampling frame is further restricted because only teachers who completed both a pre- and post-survey were included.

Although survey completion is a requirement of the OTPD course, a 100% response rate was not reached. Some information on non-respondents is available and was analyzed.

Background, demographic and experience information is available for all teachers who completed pre-surveys. This information will be compared for completers and non-completers to determine whether there is a systematic difference between the groups.

Only data for teachers who completed both the pre- and post-survey was used because research question 5 requires outcome information to test the research hypothesis.

Outcome information is only gathered on the post-survey. Ultimately, data collected from 8,560 teacher participants was used in this analysis.

Variables

Outcome Variable: The outcome variable used in this analysis is whether a teacher will enroll in a future eLearning OTPD course. One item on the teacher post survey asked teachers to indicate how likely they are to enroll in a future eLearning OTPD course. Teachers were asked to select from; “Very Likely”=4, “Somewhat Likely”=3, “Somewhat Unlikely”=2, “Unlikely” = 1. The mean rating for all teachers who took the pre and post survey was 3.7, $SD=.51$ ($n=8,560$).

Predictor Variables: The predictor variables in this analysis are: facilitator rating of training course quality, facilitator rating of preparedness, facilitator rating of readiness, facilitator rating of training course effectiveness.

Analytic Procedures

To test the hypothesis in research question 4, a multiple regression analysis will be used. The analysis will determine differences between respondents based on naturally occurring relationships..

The main effects multiple regression equation constructed for this analysis takes the form:

$$Teach_Enrll = a + b_1(fac_rate) + b_2(fac_prep) + b_3(fac_read) + b_4(fac_eff) \quad \text{where;}$$

Teach_Enrll is the teacher rating of likelihood of enrolling in a future eLearning OTPD course.

“a” is the constant, where the regression line intercepts the y axis. This represents the value of teacher rating when all of the independent variables equal zero. This value includes the error term.

The “b’s” are the regression coefficients representing the amount that teacher rating of likelihood of future enrollment changes when the corresponding independent variable changes one unit.

Summary

Chapter One introduced professional development and the importance of maintaining high quality pre- and in-service teacher training. The federal government has articulated the importance of such training via the most recent reauthorization of the Elementary and Secondary Education Act, the 2001 No Child Left Behind Act. Chapter one also indicated that teachers, administrators, and the pertinent literature in the field have echoed the sentiments of the federal government. Challenges that school districts are facing in implementing high quality TPD was discussed and the emergence of OTPD as an alternative to traditional face-to-face PD was presented. The rapid growth of the field, however, has not allowed for systematic examination of the delivery of such programs.

The problem that this presents is that although OTPD is a viable and effective alternative to face-to-face TPD, too few programs are requiring that facilitators delivering OTPD are trained in the skills and best practices for delivering TPD online. This is occurring even as the recent literature in the field has examined the distinct differences in skills necessary for delivering TPD online versus face-to-face. Such findings were presented in Chapter Two.

This study will investigate the effects of a specific OTPD facilitator training program to answer the question, “is effectively training facilitators to deliver PD online related to higher teacher and student outcomes?” Whereas most OTPD studies conducted

to date have investigated programs that do not require facilitators to complete a training program this program is unique in that it requires facilitators to complete a 10 week training program prior to facilitating an OTPD course. The unique model followed by eLearning for Educators provides an opportunity to systematically examine the facilitator training program and determine whether there is a relationship between success in such a training course and TPD outcomes of interest.

Chapter three described how the study intends to measure this relationship by using multiple regression and logistic regression. The results of the analysis will determine whether there is a relationship between how facilitators perceive the training course prepared them to deliver effective OTPD and outcomes that have been shown to be indicators of effective professional development including: high ratings, course completion, classroom implementation, student impacts and ongoing training. The study seeks to find factors associated with the online facilitator-training course that could account for recognizable differences in teacher and student outcomes of interest. The results are intended to inform OTPD processes as well as teacher retention and content implementation. The study will further present a model for examining facilitator training effects that can be replicated in other OTPD programs.

Chapter 4: Results

The previous chapter described the intervention, instruments, data collection, and analytical methods that were used in this research. The chapter outlined how the researcher navigated through various methodological decisions in an attempt to determine the most appropriate and practical analyses for each research question. Chapter 4 will discuss the methods employed focusing on the nature of the relationship between facilitator training workshop ratings and teacher outcomes of interest. The relationship is examined in a number of ways. An unconditional hierarchical linear model is built without using any predictors to determine whether there is nesting in the data, and if a multi-level model should be built. This chapter then presents the chosen analyses for each of the five research questions and discusses each of the findings. Supporting tables and narratives are included as well.

Unconditional Hierarchical Linear Model

The “null” hierarchical linear model was constructed first. No predictors were included in this model at either the first or the second level. There is only one random effect in the model. It is equivalent to the one-way ANOVA with random effects, and simply serves as a first step in a Multi-level analysis and a baseline by which to evaluate subsequent models. The “null” model will serve, in this analysis, to calculate the intraclass correlation coefficient as well as test whether τ_{00} (tau) is statistically significantly different from zero.

The statistical model for the unconditional model is $Y_{ij} = \gamma_{00} + r_{ij} + u_{0j}$ where:

- Y_{ij} , the level one intercept, the mean quality rating for all J cohorts, is predicted at the level-2 with a single parameter, the level-2 intercept, γ_{00} , the grand mean for the population.
- γ_{00} is the grand mean of the outcome variables in the population
- r_{ij} is the error associated with the teacher participants. It is the individual level random effect, assumed to be normally distributed with a mean of 0 and a variance σ^2
- u_{0j} is the error associated with each cohort (or the random between cohort effect). The cohort level random effect is also assumed to be normally distributed with a mean of zero and a variance τ_{00} .

The intraclass correlation coefficient (ICC) or $r = s^2_b / (s^2_b + s^2_w)$ which was obtained through this analysis indicated the proportion of variance that is between cohorts. If the ICC=0, no correlation among participants within a cohort exists. As the ICC approaches 1, the responses provided by participants within the same cohort become more alike.

The results from this analysis were used to test whether the variability in the cohort intercepts was statistically significantly different from 0; that is whether all cohorts had an identical mean. To determine cohort intercept variability the tao statistic was tested.

$$H_0 : \tau_{00} = 0$$

$$H_1 : \tau_{00} \neq 0$$

These results were used to determine whether there are significant differences between cohorts in outcome variables of interest that warranted modeling between-cohort effects. Generally, if there is an intraclass correlation coefficient that is greater than zero

and the estimated value of τ^2 is statistically significantly different from zero at the .05 level, a multi-level model should be employed.

Variance components were used to estimate the amount of nesting in the data. An intraclass correlation coefficient was calculated. The variance between facilitators was divided by the total variance.

$$ICC = \rho = \frac{.042607}{.042607 + .461252} = .0845$$

The results indicate that only 8.4% of the variance is attributable to nesting within facilitators (i.e. cohorts). Further, when a multi-level model was run, the results indicated that the predictors accounted for only 13% of that 8%. My a priori decision rule was: if the ICC was less than 10%, single level models would be used. As 8.4% indicated that using single level models would not create extensive bias in the estimates, such single level models were employed.

Research Question One

Research Question

To what extent are facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and training course quality related to teacher perceptions of OPD course quality?

Hypothesis

I hypothesized that higher facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and course quality would be positively related to teacher perceptions of OTPD quality.

Sample Description

The target population was all teachers who self select into an OTPD workshop taught by an EDC trained facilitator. The sample began with all teachers who self-selected into one of 70 OTPD workshops. The sample was further restricted to only teachers who had successfully completed both the pre and the post survey. This resulted in a sample of 8,560 teachers.

The typical participant in this sample is a White, English speaking female between the ages of 26 and 35 whose highest level of education is a Bachelors degree and who is currently employed as an Elementary School teacher with a State Certification in her current teaching area. This typical participant has never taken a course in this subject matter but has taken an online workshop prior to enrolling in an eLearning for Educators course.

The majority of teachers in this sample are female (75%). Teachers between the ages of 26-35 make up the largest proportion in the sample (32%), followed by the age group 36-45 (23%) and teachers ages 46-55 made up 21% of the sample. Finally, the age group with the smallest proportion of teachers indicated being over 55 years of age (7%). The majority of respondents indicated White as their race (69%), while the next largest group (16%) was African American. Latino and American Indian participants each made up 1% of the sample. Table 10 summarizes the participant demographics in this sample.

Table 10.
Breakdown of Teacher Demographics for Sample One

Teacher Demographics		
Gender	#	%
Female	6430	75
Male	1189	13
Missing System	941	11
Age	#	%
Under 25	590	7
26-35	2716	32
36-45	1941	23
46-55	1783	21
Over 55	609	7
Missing System	921	11
Race/Ethnicity	#	%
Latino/Hispanic	104	1
American Indian	89	1
Asian	15	0
Black	1563	18
Native Hawaiian	4	0
White	5934	69
Other	93	1
English as a First Language	#	%
Yes	7570	88
No	81	1
Missing System	909	11
Note: n=8560		

When asked to indicate his or her highest level of education, the largest proportion of respondents indicated having received a Bachelors degree (43%), while 34% indicated completing a level of education not listed as an option on the survey. Only 10% of participants indicated that they had received either a Masters degree or Ph.D. Participants completing an Associates degree or a CAGS each made up 1% of the sample.

Participants were asked to select their current title from a list of six options. Elementary School Teachers, High School Teachers, and Middle School Teachers made up the largest proportion of respondents (24%, 23%, and 20% respectively). Only four

percent of participants indicated that their current title was an Administrator and 78 teachers, (1% of the sample) selected Pre-K teacher as their title.

The vast majority of respondents (80%) indicated that they held a state teaching certificate in their current area of teaching, while only 9% indicated that they did not.

Table 11 presents a summary of respondent background characteristics.

Table 11.
Breakdown of Teacher Background Characteristics for Sample One

Teacher Background Characteristics		
Highest Level of Education	#	%
Associates	72	1
Bachelors	3709	43
Masters	334	4
CAGS	61	1
PhD/EdD	538	6
Other	2929	34
Missing	917	11
Current Title	#	%
Administrator	342	4
College Instructor	2	0
High School Teacher	2000	23
Middle School Teacher	1722	20
Elementary Teacher	2074	24
Pre-K Teacher	78	1
Other	1286	15
Missing	1056	12
State Certificate	#	%
Yes	6823	80
No	785	9
Missing	952	11
Note: n=8560		

The majority of teachers (55%) had taken an online workshop prior to enrolling in eLearning for Educators but had never taken a course in the subject matter of this workshop (69%). Table 12 provides a summary of respondents' experience characteristics.

Table 12.

Breakdown of Relevant Teacher Experience Characteristics for Sample One

Teacher Experience Characteristics		
Taken a Course in This Subject	#	%
Yes	1759	21
No	5893	69
Missing	908	11
Taken an Online Workshop	#	%
Yes	4685	55
No	2951	34
Missing	924	11
n=8560		

Analysis Employed

To test the first research hypothesis a multiple regression analysis was employed. The outcome variable was teacher's rating of OPD workshop quality. Data were collected through one question on the post-survey, 'Rate the overall quality of the workshop'. The predictor variables were facilitator self-reported level of preparedness, facilitator self-reported level of readiness, facilitator rating of workshop effectiveness, and facilitator rating of overall training workshop quality.

H₀: There is no statistically significant ($\alpha > .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher ratings of OPD workshop quality.

H₁: There is a statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher ratings of OPD workshop quality.

A multiple regression was employed to determine if a statistically significant relationship existed between facilitators' perception of the training workshop quality and teacher ratings of OPD workshop quality. The overall model was statistically significant

at the .05 level, however only one of the predictor variables (facilitator rating of perceived level of readiness to facilitate an OTPD workshop) was found to be statistically significant.

Variable correlations examined the relationship between the predictor variables. Table 13 presents the correlations between the predictor variables in the model. The results in Table 13 indicate that there is statistically significant correlation between the predictor variables; they were nevertheless all included in the multiple regression model. Correlation between predictor variables indicates that there may be the presence of multicollinearity. Multicollinearity will not bias the results, however it will produce larger standard errors in the related independent variables. The variables have been left in the model in this case, because with such a large sample size and small to moderate correlations, the presence of multicollinearity will not affect the fitted model. There is also a theoretical basis for inclusion of these variables as well. A review of the literature indicated that these if facilitators mastered each of the skills represented by these variables, teachers in professional development workshops would be more satisfied with the training.

Table 13.
Correlations Between Predictor Variables to Determine Multicollinearity

Correlations Between Predictor Variables				
	fac_prep	fac_eff	fac_rate	fac_read
Quality	0.021*	0.021*	-.020	0.025*
fac_prep	1.000	.273**	.037**	-.119**
fac_eff	.273**	1.000	.080**	.140**
fac_rate	.037**	.080**	1.000	.257**
fac_read	-.119**	.140**	.257**	1.000

Note: n=8,560

** Correlation is significant at the 0.05 level

* Correlation is significant at the 0.01 level

The R-Square can be found in Table 14; this value indicates the proportion of variance in teacher rating of overall workshop quality which can be accounted for by all of the predictor variables. Essentially R square is an overall measure of strength of association; it does not give any information with regard to the extent to which individual independent variables in the model are associated with teacher rating of overall course quality.

Table 14.
Overall Multiple Regression Model for Sample One with Related Variables

Model Summary			
Model	R Square	F	Sig
1	0.002	3.676	0.005

Note: n=8,560

Table 14 indicates that overall 0.2%, an extremely small amount of the variance, in teacher rating of overall course quality can be explained by the predictor variables in this model. Table 14 also indicates that the model is statistically significant at the .05 level ($F=3.676, p<.05$). Table 15 further shows the effect of including each individual predictor variable in the model.

Table 15.
Coefficients Included in Model One for Testing the Hypothesis

Coefficients					
	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Error	Beta	t	Sig
Constant	4.088	0.114		35.885	0.000
fac_prep	0.004	0.002	0.022	1.956	0.051
fac_eff	0.003	0.003	0.012	1.054	0.292
fac_rate	-0.013	0.007	-0.021	-1.858	0.063
fac_read	0.035*	0.013	0.032	2.743	0.006

Note: n=8,560

*=Statistically significant

The first column in Table 15 shows the predictor variables that were included in the model. These predictor variables include: facilitator rating of his or her perception of level of preparedness to facilitate an online workshop, facilitator rating of the effectiveness of the training workshop, his or her rating of the overall quality of the training workshop, and facilitator rating of his or her perceived level of readiness to facilitate an online workshop. The first variable represents the constant, the location of the regression line when it crosses the Y-axis. This is the predicted value of teacher overall rating of workshop quality without taking into account the influence of the other variables. Table 15 then displays the unstandardized and standardized coefficients of each of the predictor variables in the model. These values can be used to write the complete regression equation for predicting the dependent variable from the independent variables. For this analysis the full regression equation would be:

$$\text{Teach_rate}_{\text{predicted}} = 4.088 + (0.004)(\text{fac_prep}) + (0.003)(\text{fac_eff}) + (-0.013)(\text{fac_rate}) + (0.035)(\text{fac_read})$$

In the analysis of these data, missing cases were deleted listwise and outliers were examined for deletion. Ordinary Least Squares regression assumptions were met in the multiple regression analyses: the standardized residuals were normally distributed; there was no correlation between the studentized residuals and the standardized predicted values; and the normal probability plots indicated that the observed and predicted distributions of the residuals were closely aligned. Cook's D values indicated that none of the cases in any of the models were highly influential. Once these preliminary analyses were examined, a multiple regression was employed.

Results for this model indicated the following: for every one unit increase in facilitator rating of overall training workshop quality, a non-statistically significant .004

unit increase in teacher rating of overall workshop quality is predicted, holding all other variables constant. For every one unit increase in facilitator rating of preparedness for teaching an OPD workshop, a .003 unit increase in teacher rating of overall workshop quality is predicted, holding all other variables constant. This relationship, however, is not statistically significant. For every one unit increase in facilitator rating of readiness to facilitate an online workshop, a non-statistically significant .013 unit decrease in teacher rating of overall workshop quality is predicted, holding all other variables constant. Finally, for every one unit increase in facilitator rating of training workshop effectiveness, a .035 unit increase in teacher rating of overall workshop quality is predicted, holding all other variables constant. This is the only predictor variable that is statistically significant in the model.

These results indicate that although small, there is a statistically significantly positive relationship between facilitator ratings of training workshop effectiveness and facilitator ratings of training course quality. That is to say that the more positively a specific facilitator rates the readiness to facilitate an OTPD workshop following his or her training workshop, a teacher in that facilitator's cohort is statistically significantly more likely to give the workshop a higher rating in terms of workshop quality. The significance of the individual variables is important to consider, however as when considered independently, a facilitator's rating of his or her readiness to facilitate an online workshop is the only variable found to be statistically significant. It can be inferred therefore, that the skills associated with facilitator readiness, including familiarity with the basic techniques for facilitating an effective online workshop, perceived level of readiness to facilitate an

online workshop, and having a clear understanding of responsibilities associated with being a workshop facilitator are indicators of participant satisfaction.

Further, although the findings in this analysis indicate that there was a statistically significant relationship between a facilitator rating of workshop effectiveness and the outcome variable, it is important to caution the reader of the difference between statistical and practical significance. Statistical significance is informed by, among other things, the size of the sample. A researcher may be able to find statistical significance due to a very large sample. Although statistical significance is present, this may not mean that the results are practically significant. I am suggesting, therefore, that while the findings reported above may be statistically significant, the effect is very small and may not be of practical significance. The results of this analysis will be discussed in further detail and in this context in Chapter 5.

Research Question Two

Research Question

How is teachers' completion of an OTPD course influenced by facilitators' self reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and overall training course quality?

Hypothesis

I hypothesized that higher facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and overall training course quality would increase the likelihood of teachers' completing their respective OTPD workshop after controlling for school characteristics.

Sample Description

The target population was all teachers who self selected into an OTPD workshop taught by an EDC trained facilitator. The sample began with all teachers who self selected into one of 70 OTPD workshops but had restrictions. The sample was restricted to only teachers who had successfully completed the pre-survey. The resulting sample was 11,532 teachers.

The typical participant in this sample was the same as in the previous research question. She was a White, English speaking female between the ages of 26-35 whose highest level of education is a Bachelors degree and who was currently employed as an Elementary School teacher with a State Certification in her current title. This typical participant has never taken a course in this subject matter but has taken an online workshop prior to enrolling in eLearning for Educators.

The background and experience characteristics of the teachers in this sample were very similar to those in the previous sample. Complete demographic and background tables can be found in Appendix B.

Analysis Employed

To test the second research hypothesis a logistic regression analysis was employed. The dichotomous outcome variable was whether or not a teacher completed the eLearning workshop. Completion was measured by whether or not the teacher had completed the course post-survey. If the teacher successfully completed both the course pre-survey and course post-survey, he or she was considered a ‘completer’, whereas if the teacher had completed only the pre-survey he or she was considered a ‘non-completer’. Although it is possible that a participant may have completed the workshop but not the

survey it is beyond the control of the researcher to measure those participants as the researcher did not have access to that information. The predictor variables were facilitator self-reported level of preparedness, facilitator self-reported level of readiness, facilitator rating of workshop effectiveness, and facilitator rating of overall training workshop quality. These are the same four predictor variables measured in Research Question one. These same predictor variables have been used in each of the research questions tested because previous research has indicated that these are areas that may affect teacher perception of professional development.

H₀: There is no statistically significant ($\alpha > .05$) relationship between facilitator self-reported ratings of training workshop quality and whether a teacher successfully completes the eLearning workshop in which he or she was enrolled.

H₁: There is a statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and whether a teacher successfully completes the eLearning workshop in which he or she was enrolled.

A base model, which included only the intercept, was analyzed first. An extended model was then constructed on the base model including variables that theoretically are expected to help predict the likelihood of whether or not a teacher will complete his or her OPD workshop. That is, the extended model was tested to determine whether there was a better model fit once the predictor variables were included in the model.

Table 19 indicates that overall 11,413 cases (99%) were included in the analysis, and 119 cases (1%) were missing. Cases were deleted listwise if there was a missing value for any variable in the model.

Table 19.

Description of Cases that were Included and Excluded from the Analysis

Case Processing Summary			
Unweighted Cases		N	%
Selected Cases	Included in Analysis	11413	99
	Missing	119	1
	Total	11532	100
	Unselected Cases	0	0
	Total	11532	100

Note: n=11532

The researcher worked with different steps in the model. The primary difference between each step is the chosen predictors included. This method is similar to blocking variables into groups and entering them into the analysis. Initially the null model, which included only the intercept, was run leaving out all predictor variables. This model produced the percent of cases for which the dependent variable was accurately predicted given the model. That is, how well the model determines completers and non-completers, if we were not to include any predictors in the model. As shown in Table 20, in the null model 79.7% of the cases were correctly predicted. As the reader may observe, all participants were predicted as having completed the workshop. This model is important because the researcher will compare it to the model including predictors to determine whether the model with the predictors more accurately determines group placement.

Table 20.

Description of Null Model, Observed, Predicted, and Overall Percentage of Cases Correctly Predicted

Classification Table				
		Predicted If Completed		
		No	Yes	% Correct
If Completed	No	0	2316	0
	Yes	0	9097	100
	Overall %	136		79.7

Note: cut value is .500**

Note: n=11532

By testing the Wald χ^2 statistic, this model further showed that the null hypothesis is rejected at the .05 level ($p < .001$). Hence it is concluded that the constant is not zero.

These results can be seen in Table 21.

Table 21.

Test of the Null Hypothesis That the Constant Equals Zero

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Constant	1.368	0.023	3455.21	1	0.000	3.928

Note: n=11532

Table 22 presents the score test, which is used to determine whether an independent variable would be significant in the extended model. Table 22 indicates that three of the four predictor variables are statistically significant and should therefore be included in the extended model. Additionally, the overall statistic, indicating the result of including all of the predictors in the model, is also statistically significant at the .05 level.

Table 22.

The Score Test Used , Degrees of Freedom, and Overall Statistic for Question 2

Variables Not in the Equation				
		Score	df	Sig.
Variables	fac_prep*	8.737	1	0.003
	fac_eff*	6.245	1	0.012
	fac_rate*	11.41	1	0.001
	fac_read	1.518	1	0.218
	Overall Statistic*	31.685	4	0.000

Note:n=11532

Note: *= statistically significant

The Extended Model was then analyzed. The χ^2 statistic and its significance level were, among other statistics, produced. The Step, Model, and Block values and statistics were all presented; however in this analysis these values are identical because the

researcher did not use stepwise logistic regression or blocking. As the readers can see in Table 23 (the omnibus tests of model coefficients), values given in the Sig. column are the probability of obtaining the χ^2 statistic if there is in fact no effect of the independent variables, taken together, on the dependent variable. In this analysis the model is statistically significant ($\chi^2 = 30.558$, $p < .001$). As there is one degree of freedom for each predictor in the model, there are four degrees of freedom.

Table 23.
Chi-square and Significance for Question 2.

Omnibus Test of Model Coefficients			
	Chi-Square	df	Sig
Step	30.558	4	0.000
Block	30.558	4	0.000
Model	30.558	4	0.000

Note: n=11532

Logistic regression analyses do not produce a statistic equivalent to R-squared. Rather, maximum likelihood estimates are produced. Although the maximum likelihood estimates are not calculated to minimize variance, the goodness of fit of logistic regression models can be evaluated through pseudo R-squareds. Like R-squareds, pseudo R-squareds range from 0 to 1. A higher pseudo R-squared value indicates a better model fit. The Cox & Snell R Square and the Nagelkerke R Square in this analysis are presented in Table 24. In this analysis the Cox & Snell R Square is rather small at .003. It is important to note, however, that the Cox and Snell pseudo R-squared has a maximum value that is not 1. If the full model were to predict the outcome perfectly, Cox & Snell would then be less than one. The Nagelkerke R Square, however, adjusts the Cox & Snell so that the range of values is from 0 to 1. In the case of this model, the

value is .004. As the reader can see in Table 24, both the Cox & Snell R Square and the Nagelkerke R Square are extremely small indicating that this is not a very good model fit.

Table 24.

-2 Log Likelihood for the Final Model to be Compared with the Reduced Models

Model Summary			
Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	11483.623	0.003	0.004

Note: n=11532

Table 25 presents the classification table. Table 25 includes the observed cases in the dependent variable as well as the predicted values of the dependent variable based on the full logistic regression model. It is used to evaluate the predictive accuracy of the logistic regression model. Table 25 tallies correct and incorrect estimates for the full model. In this analysis, a cut-off value of $p=0.50$ was selected. This value was selected because there is no precedent for a different cut-value in this case, and .50 is a moderate cut-value. It is important to note, however, that different cut-values were attempted in this analysis to determine if it explained the data any better. Table 25 indicates that 9,097 cases were observed to have completed the workshop and were predicted to have not completed the workshop. Table 25 also indicates that 2,316 cases were observed to have completed the workshop and were predicted to have completed the workshop. The columns are the two predicted values of the dependent variable, while the rows are the two observed values of the dependent variable. In a perfect model, all cases will be on the diagonal and the overall percentage correct would be 100%. If the logistic model has homoscedasticity, the percent correct will be approximately the same for both rows. In this model it is not. While the overall percent correctly predicted seems moderately good at 79.7%, it is important to note that blindly estimating the most frequent category for all

cases would yield the same percent accurately estimated (as seen in Table 20). This implies that whether or not a teacher completed the training course cannot be differentiated on the basis of facilitator ratings of facilitator training workshop quality. As the reader can see in Table 25, .5 was used as the cut-point. It is important to note that other cut-points were attempted as well, all resulting in the same findings.

Table 25.
The Predicted Values of the Dependent Variable Based on the Full Logistic Regression Model.

Classification Table				
Observed		Predicted If Completed		
		No	Yes	% Correct
If Completed	No	0	2316	0
	Yes	0	9097	100
	Overall %			79.7

Note: cut value is .500

Note: n=11532

The logistic regression equation for predicting whether a teacher would successfully complete the training session was constructed next. To determine the logistic regression equation, log-odds units are produced. These estimates tell the amount of increase or decrease in the odds of a teacher completing the OPD workshop that would be predicted by 1 unit increase or decrease in the predictor variable, holding all other predictors constant. Table 26 displays this information.

Table 26.
Values for the Logistic Regression Equation for Question 2

Variables in the Equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
fac_prep*	0.023	0.006	15.498	1	0.000	1.023
fac_eff*	-.030	0.009	10.71	1	0.001	0.97
fac_rate*	-.053	0.017	10.243	1	0.001	0.948
fac_read	0.016	0.037	0.176	1	0.675	1.016
Constant	1.21	0.327	13.7	1	0.000	3.354

Note: n=11532

The full equation for this model would be written as:

$$\text{Log}(p/(1-p)) = 1.21 + (0.023)(\text{fac_prep}) - (.030)(\text{fac_eff}) - (.053)(\text{fac_rate}) + (0.016)(\text{fac_read})$$

The Wald statistic in Table 26 and the corresponding significance levels test the significance of each of the covariates in the model. The ratio of the logistic coefficient B to its standard error S.E., squared, equals the Wald statistic. Table 26 indicates that facilitator rating of perceived preparedness to facilitate a workshop, training workshop effectiveness and facilitator rating of overall workshop quality are statistically significant while facilitator rating of readiness to facilitate an OTPD workshop is not. The final column of Table 26 indicates the predicted change in the odds for a unit increase in the corresponding independent variables. Odds ratios less than 1.0 correspond to decreases and odds ratios more than 1.0 correspond to increases in odds. Odds ratios close to 1.0 indicate that unit changes in that independent variable do not affect the dependent variable.

Table 26 also indicates that for every one unit increase in facilitator rating of perceived level of preparedness to facilitate an OTPD workshop, one can expect a .023 statistically significant increase in the log-odds of teachers likelihood of completing the OPD workshop, holding all other independent variables constant ($p < 0.001$).

$$\text{Log}(\text{odds Completion}) = 1.21 + (0.023)(\text{fac_prep})$$

This means that whenever two ratings differ by one point in fac_prep, the log odds of teacher workshop completion differ by .023, holding all other predictor variables constant. The positive value of the log-odds indicates that higher facilitator ratings of

perceived level of preparedness will result in a greater likelihood that a teacher will complete the training workshop.

Table 26 further indicates that for every one unit increase in facilitator rating of perceived level of workshop effectiveness, one can expect a 0.030 statistically significant decrease in the log-odds of teachers likelihood of completing the OPD workshop, holding all other independent variables constant ($p=0.001$)

$$\text{Log (odds Completion)} = 1.21 + (-.030)(\text{fac_eff})$$

This means that whenever two ratings differ by one point in fac_eff, the log odds of teacher workshop completion differ by a statistically significant -0.030, holding all other predictor variables constant. The negative value of the log-odds indicates that higher facilitator ratings of workshop effectiveness will result in a lesser likelihood that a teacher will complete his or her chosen OPD workshop.

Table 26 also indicates that there is a statistically significant relationship between teacher workshop completion and facilitator rating of training workshop quality.

Findings indicate that for every one-unit increase in facilitator rating of overall workshop quality one can expect a statistically significant 0.053 decrease in the log-odds of teacher likelihood of completing the OPD workshop, holding all other independent variables constant ($p=0.001$).

$$\text{Log (odds Completion)} = 1.21 + (-0.053)(\text{fac_eff})$$

This means that whenever two ratings differ by one point in fac_rate, the log odds of teacher workshop completion differ by -0.053, holding all other predictor variables constant. This equation indicates that the higher a facilitator trainees rates the

effectiveness of the training workshop, the less likely it is that a teacher will complete the OPD workshop.

Finally, findings indicate that there is a non-significant relationship between facilitator rating of perceived level of readiness to facilitate a workshop and teacher likelihood of completing the OPD workshop. Findings indicate that for every one-unit increase in facilitator rating of perceived level of preparedness one can expect a 0.016 increase in the log-odds of teacher likelihood of completing the OPD workshop, holding all other variables constant.

Findings suggest that overall this model was not a better fit for these data than was the base model without any predictors, as the model with predictor variables did not more accurately predict completers; however three of the variables in the model were statistically significant, so further research to that end is suggested. Although facilitator ratings of training workshop effectiveness are not significant determiners of whether or not a teacher finishes the workshop, these findings are nevertheless important. The findings of this research provide evidence that how a facilitator rated a training workshop does not influence teacher attrition; stakeholders therefore, can direct resources in other directions should teacher attrition be a foci of program improvement.

Research Question Three

Research Question

How is teachers' likelihood of implementing the learned professional development in their classroom influenced by facilitators' self reported ratings of training

workshop effectiveness, level of preparedness, level of readiness, and overall training course quality?

Hypothesis

I hypothesized that higher facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and overall training course quality would increase the likelihood of teachers implementing the learned professional development in their classroom within six months of completing the eLearning professional development workshop.

Sample Description

The target population is all teachers who self select into an OTPD workshop taught by an EDC trained facilitator. The sample began with all teachers who self selected into one of 70 OTPD workshops but had restrictions. The sample was restricted to only teachers who had successfully completed both the pre-, post-, and follow-up surveys. This resulted in a sample of 917 teachers.

This sample is much like those presented in the first two research questions. The typical participant in this sample is a White, English speaking female between the ages of 46-55 whose highest level of education is something other than those which were offered as options in the survey and who is currently employed as a High School teacher with a State Certification in her current title. This typical participant has never taken a course in this subject matter but has taken an online workshop prior to enrolling in eLearning for Educators. Tables presenting complete demographic and background characteristics of teachers in this sample can be found in Appendix B.

Analysis Employed

To test the third research hypothesis a logistic regression analysis was employed. The dichotomous outcome variable was whether or not a teacher who had completed the OPD workshop reported implementing the PD learned in the eLearning workshop within six months of workshop completion. Whether a teacher had implemented the content was measured by one item on the Six Month Out Follow Up Survey that asked teachers to indicate whether they had implemented the learned PD within six months of successfully completing the eLearning workshop. As in the previous analyses, the predictor variables were facilitator self-reported level of preparedness, facilitator self-reported level of readiness, facilitator rating of workshop effectiveness, and facilitator rating of overall training workshop quality.

H₀: There is no statistically significant ($\alpha > .05$) relationship between facilitator self-reported ratings of training workshop quality and whether a teacher implements the learned PD.

H₁: There is a statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and whether a teacher implements the learned PD.

A logistic regression was employed to determine if a statistically significant relationship existed between facilitators' perception of the training workshop quality and teacher implementation as measured on the Follow-Up survey. The predictor variables that were included in the model were: facilitator rating of workshop quality, facilitator rating of workshop effectiveness, facilitator perceived level of readiness to facilitate, and facilitator perceived level of preparedness to facilitate.

Table 27 indicates that overall 828 cases (90.3%) were included in the analysis, and 89 cases (9.7%) were missing. Cases were deleted listwise if there was a missing value for any variable in the model.

Table 27.

Cases that were Included and Excluded from the Analysis for Question 3.

Case Processing Summary			
Unweighted Cases		N	%
Selected Cases	Included in Analysis	828	90.3
	Missing	89	9.7
	Total	917	100
	Unselected Cases	0	0
	Total	917	100

Note" n=917

The Base Model, including only the intercept was analyzed first. As this model does not include any predictors, all teachers who implemented the material in their classroom were correctly classified, and all who did not were incorrectly classified. This information is presented in Table 28.

Table 28.

Observed, Predicted, and Overall Percentage of Cases Correctly Predicted for Question 3

Classification Table				
Observed		Predicted If Implemented		
		No	Yes	% Correct
If Implemented	No	0	153	0
	Yes	0	675	100
	Overall %			81.5

Note: cut value is .500

Note: n=917

By testing the Wald χ^2 statistic this model further showed that the hypothesis is rejected at the .05 level ($p < .001$). Hence it is concluded that the constant is not zero.

These results can be seen in Table 29.

Table 29.
Test of the Null Hypothesis

Variables in the Equation						
	B	S.E	Wald	df	Sig.	Exp(B)
Constant	1.484	0.09	274.785	1	0.000	4.412

Note: n=917

The score test is presented in Table 30. This value is used to predict whether an independent variable would be statistically significant in the extended model. In this analysis it is determined that none of the predictor variables would be significant in the extended model. Additionally, the overall statistic, that which is produced when all of the predictors are included in the model, is not statistically significant at the .05 level either.

Table 30.
Description of Whether or Not an Independent Variable Would be Significant in the Model for Question 3.

Variables Not in the Equation				
		Score	df	Sig.
Variables	fac_prep	0.437	1	0.509
	fac_eff	0.432	1	0.511
	fac_rate	0.16	1	0.689
	fac_read	0.061	1	0.805
	Overall Statistic	1.471	4	0.832

Note:n=917

As the reader can see in Table 31, values given in the Sig. column are the probability of obtaining the χ^2 statistic if the predictor variables do not have an effect on the dependent variable. In this analysis the model is not statistically significant ($\chi^2 = 1.469, p=0.832$). That is to say that, taken together, the independent variables have no effect on the dependent variable as the p value is greater than 0.050. As there is one

degree of freedom for each predictor in the model, there are four degrees of freedom total.

Table 31.
The Probability of Obtaining the Chi-square Statistic

Omnibus Test of Model Coefficients			
	Chi-Square	df	Sig
Step	1.469	4	0.832
Block	1.469	4	0.832
Model	1.469	4	0.832

Note: n=917

The Cox & Snell R Square and the Nagelkerke R Square are presented in Table 32. These values act as pseudo R-square values in a Logistic Regression. In this analysis the Cox & Snell R Square is .002 and the Nagelkerke R Square value is .003. The very small pseudo R-squared values and the non-statistically significant predictors indicate that the model is not a very good fit.

Table 32.
-2 Log Likelihood for the Final Model to be Compared with the Reduced Models for Question 3

Model Summary			
Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	791.04	0.002	0.003

Note: n=917

Table 33 presents the classification table. Table 33 indicates that 675 cases were observed to have implemented the material and were predicted to have implemented the material. Table 33 also indicates that 153 cases were observed to have not implemented the material and were predicted to have implemented the material. In addition Table 33

shows that 0 cases were observed to have implemented the material but were predicted to have not implemented the material, and that 0 cases were observed to have not implemented the material but were predicted to have implemented the material. The overall percentage of cases that are correctly predicted by the model is also presented. Overall, the model correctly predicted 81.5% of the total cases.

Table 33.

The Predicted Values of the Dependent Variable Based on the Full Logistic Regression Model.

Classification Table				
Observed		Predicted If Implemented		
		No	Yes	% Correct
If Implemented	No	0	153	0
	Yes	0	675	100
	Overall %			81.5

Note: cut value is .500

Note: n=917

These results should be interpreted in light of the model being found not to be statistically significant. This value is important because it is identical to the base model. These values are identical because the addition of the predictor values did not help the model to fit better than the base model.

What this means is that, given the findings, facilitator perception of training workshop quality, effectiveness, his or her level of readiness or preparedness to facilitate does not statistically significantly impact the likelihood of whether a teacher will implement the learned PD in his or her classroom. Although not significant, these findings are important when considering how to improve the likelihood of

implementation and where to focus resources to that end. These results will be discussed in further detail in Chapter 5.

Research Question Four

Research Question

To what extent are facilitator self reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and course quality related to teacher perceptions of student impact in the classroom?

Hypothesis

I hypothesized that higher facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and course quality will be positively related to teacher perceptions of student impact.

Sample Description

The target population is all teachers who self select into an OTPD workshop taught by an EDC trained facilitator. The sample began with all teachers who self selected into one of 70 OTPD workshops, but there were restrictions in the sample. The sample was restricted to only teachers who had successfully completed the pre-survey, the post-survey, the follow-up survey, and indicated that they implemented the learned PD content in their classroom,. The group was restricted to this sample because teachers who did not implement the material in the classroom would not perceive the students as being impacted by the learned PD, since it was not implemented in the classroom. Teachers were given the option of selecting “I have not implemented this material in the classroom.” This restricted the sample to 683 teachers, which is 74% of the sample of teachers who had taken the Follow-Up survey.

The demographics of this sample is much like those presented in the previous research questions. The typical participant in this sample is a White, English speaking female between the ages of 46-55 whose highest level of education is something other than those which were listed as response options, and who is currently employed as a High School teacher with a State Certification in her current title. This typical participant has never taken a course in this subject matter but has taken an online workshop prior to enrolling in eLearning for Educators. Complete background and demographic specifics can be found in Appendix B.

Analysis Employed

To test the fourth research hypothesis a multiple regression analysis was employed. The outcome variable was teacher perceived student impacts. As in all previous analyses, the predictor variables were facilitator self-reported level of preparedness, facilitator self-reported level of readiness, facilitator rating of workshop effectiveness, and facilitator rating of overall training workshop quality.

H₀: There is statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher perceived student impacts.

H₁: There is a statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher perceived student impacts.

A multiple regression was employed to determine if a statistically significant relationship existed between facilitators' perception of the training workshop quality and teacher perception of student impacts as measured by a composite rating of teacher perceived student impacts. Six items on the teacher follow-up survey asked teachers to

indicate the extent to which they agreed that students were positively impacted in a number of areas. The six items were:

- (f) Students appeared more interested in class when I used the course content/approaches
- (g) Students work together more cooperatively in the classes when I use the course content/approaches.
- (h) Students' diverse learning needs were addressed better in classes using the course content/approaches.
- (i) Students' showed better academic performance in the targeted content using the course content/approaches.
- (j) Students' products were of a higher quality in classes using the course contents/approaches.

Teachers were asked to select among: "Strongly Agree"=4, "Agree"=3, Disagree"=2, and "Strongly Disagree"=1, "Not Applicable"=0.

Combined, these items made up the "student impacts" scale. Scale analyses and statistics were run on the scale to support the use of one over-arching score. Responses from all teachers have been pooled and scale and principal components analyses (PCA) were run. The scale demonstrated strong psychometric properties with a high α (.89) and with each of the items loading on one factor that accounted for 66% of the variance. The psychometric properties of the scale can be found in Table 34.

Table 34.

Percent of Variance Accounted for by the Student Impacts Scale

Student Impacts Scale	
	Fac. 1
Students appear more interested in class	0.815
Students exhibit greater cooperation	0.767
Diverse student learning needs are addressed better	0.775
Students show better academic performance	0.832
Students perform more difficult work	0.846
Students proucts are of higher quality	0.84
% Variance	66

Cronbach's Alpha=.89

Note: n=703

Missing cases were deleted listwise and outliers were examined for deletion; no cases were deleted as a result of being an outlier. A multiple regression analysis was

conducted. Ordinary Least Squares regression assumptions were met in the multiple regression analyses: the standardized residuals were normally distributed; there was no correlation between the studentized residuals and the standardized predicted values; and the normal probability plots indicated that the observed and predicted distributions of the residuals were closely aligned. Cook's D values indicated that none of the cases in any of the models were highly influential. Table 35 displays the correlations between predictor variables. Although the correlations between predictor variables are statistically significant, multicollinearity was not a threat due to the very large sample sized used.

Table 35.
Correlations Between Variables to Determine Multicollinearity for Question 4

Correlations Between Predictor Variables				
	fac_prep	fac_eff	fac_rate	fac_read
Stu_Ben	-.091	-.062	-.052	-.053
fac_prep	1.000	.323**	.142**	-.070
fac_eff	.323**	1.000	.136**	0.081
fac_rate	.142**	.136**	1.000	.126*
fac_read	0.070	0.081	.126*	1.000

Note: n=703

** Correlation is significant at the 0.01 level

* Correlation is significant at the 0.05 level

Results from this analysis indicated that the predictor variables, facilitator rating of workshop quality, facilitator rating of workshop effectiveness, facilitator perceived level of readiness to facilitate, and facilitator perceived level of preparedness to facilitate, did not have a statistically significant relationship with teacher perceived rating of student impacts at the .05 level.

The model summary can be found in Table 36. The R square, indicating the proportion of variance in teacher rating of perceived student impacts which can be

accounted for by the predictor variables, is 0.5%. The F statistic is a non-significant 0.831 ($p=0.506$).

Table 36.

The Proportion of Variance in Teacher Rating of Perceived Student Impacts

Model Summary			
Model	R Square	F	Sig
1	0.005	0.831	0.506

Note: n=703

Table 37 presents each predictor variable separately and whether each, when included in the model, would be statistically significant holding all other predictors constant.

Table 37.

Predictor Variables in the Model and Their Significance for Question 4

	Coefficients				
	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Error	Beta	t	Sig
Constant	17.650	2.285		7.723	0.000
fac_rate	0.017	0.043	0.016	0.397	0.691
fac_prep	-0.014	0.065	-.009	-.219	0.826
fac_read	-0.241	0.135	-.070	-1.781	0.075
fac_eff	0.084	0.272	0.012	0.310	0.756

Note: n=703

The first column in Table 37 shows the predictor variables that were included in the model. The first variable represents the constant, the location of the regression line when it crosses the Y-axis. This is the predicted value of teacher overall rating of workshop quality when all other variables are 0. Table 37 then displays the values for the regression equation for predicting the dependent variable from the independent variable. The regression equation for this model would be written as:

$$\text{Stud_imp}_{\text{predicted}} = 17.650 + (0.017)*(\text{fac_rate}) - (0.014)*(\text{fac_prep}) - (0.241)*(\text{fac_read}) + (0.084)(\text{fac_eff})$$

In this model, for every one unit increase in facilitator rating of overall training workshop quality, a non-significant .017 unit increase in teacher rating of mean perceived student impacts is predicted, holding all other variables constant. For every one unit increase in facilitator rating over preparedness for teaching an OPD workshop, a .014 unit decrease in teacher rating of perceived student impacts is predicted, holding all other variables constant. This relationship, however, is not statistically significant. For every one unit increase in facilitator rating of readiness to facilitate an online workshop, a non-significant .241 unit decrease in teacher rating of perceived student impacts is predicted, holding all other variables constant. Finally, for every one unit increase in facilitator rating of training workshop effectiveness, a non-significant .084 unit increase in teacher rating of perceived student impacts is predicted, holding all other variables constant.

As this full model was found to be non-significant, these results indicate that higher facilitator trainee ratings of the quality and effectiveness of the training workshop, higher perceived readiness and preparedness to facilitate a training course are not statistically significantly related to higher teacher perceptions of their student impacts. These findings indicate that teachers who complete OPD workshops delivered by facilitators who have perceived the training workshop to be of high quality are not statistically significantly more likely to perceive their students to be impacted by the learned OPD.

Research Question Five

Research Question

To what extent are facilitator self reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and course quality related to teacher perceived likelihood of enrolling in a future eLearning for Educators workshop?

Hypothesis

I hypothesized that higher facilitator self-reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and course quality will be positively related to teacher perceived likelihood of enrolling in a future eLearning for Educators workshop.

Sample Description

The target population is all teachers who self select into an OTPD workshop taught by an EDC trained facilitator. The sample began with all teachers who self selected into one of 70 OTPD workshops, but there were restrictions in the sample. The sample was restricted to only teachers who had successfully completed both the pre and the post survey. This resulted in a sample of 8,560 teachers. The sample is the same as used in Research Question 1.

Analysis Employed

To test the fifth research hypothesis, a multiple regression analysis was employed. The outcome variable was teacher perception of likelihood of taking another eLearning for Educators workshop. The predictor variables were facilitator self-reported level of preparedness, facilitator self-reported level of readiness, facilitator rating of workshop effectiveness, and facilitator rating of overall training workshop quality.

H₀: There is no statistically significant ($\alpha > .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher perceived likelihood of enrolling in a future eLearning for Educators workshop.

H₁: There is a statistically significant ($\alpha < .05$) relationship between facilitator self-reported ratings of training workshop quality and teacher perceived likelihood of enrolling in a future eLearning for Educators workshop.

A multiple regression was employed to determine if a statistically significant relationship existed between facilitator's perception of the training workshop quality and whether a teacher is going to take another OTPD workshop as measured by a single item on the post-survey that asked teachers to indicate how likely they are to enroll in a future eLearning OTPD course. Teachers were asked to select from: "Very Likely"=4, "Somewhat Likely"=3, "Somewhat Unlikely"=2, "Unlikely" = 1. The mean rating for all teachers who took the pre and post survey was 3.7, $SD=.51$ ($n=8,560$).

A multiple regression analysis was run. Missing cases were deleted listwise and outliers were examined for deletion. Ordinary Least Squares regression assumptions were met in the multiple regression analyses: the standardized residuals were normally distributed; there was no correlation between the studentized residuals and the standardized predicted values; and the normal probability plots indicated that the observed and predicted distributions of the residuals were closely aligned. Cook's D values indicated that none of the cases in any of the models were highly influential.

The full model was found to be statistically significant when all predictor variables were included; however when considered individually, only one of the predictor variables was found to be statistically significant. Facilitator rating of workshop quality,

facilitator rating of workshop effectiveness, and facilitator perceived level of readiness to facilitate did not have a statistically significant relationship with teacher perceived likelihood of enrolling in a future OTPD workshop. Facilitator rating of perceived level of preparedness to facilitate, when considered individually, was found to have a statistically significant relationship at the .05 level.

Presented in Table 38 is the R-square. This value indicates the proportion of variance in teacher rating of perceived likelihood of taking a future eLearning for Educators workshop that can be explained by facilitator rating of workshop quality, facilitator rating of workshop effectiveness, facilitator perceived level of readiness to facilitate, and facilitator perceived level of preparedness to facilitate.

Table 38.
Overall Model Significance for Question 5.

Model Summary			
Model	R Square	F	Sig
1	0.001	2.766	0.026

Note: n=8,524

Table 38 indicates that .1% of the overall variance in teacher rating of perceived likelihood of taking a future eLearning for Educators workshop can be explained by the predictor variables in this model. This is an extremely small proportion of the overall variance. The table also indicates that the complete model is statistically significant at the .05 level ($p < .05$). Table 39 presents each predictor variable included in the model and whether that predictor variable is statistically significant when all other variables are held constant.

Table 39.
Statistical Significance of Variables in the Model for Question 5.

	Coefficients				
	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Error	Beta	t	Sig
Constant	3.535	0.083		42.355	0.000
fac_prep	0.004*	0.001	0.034	2.936	0.003
fac_eff	0.000	0.002	0.001	0.054	0.957
fac_rate	-0.005	0.005	-0.012	-1.073	0.283
fac_read	0.014	0.009	0.018	1.510	0.131

Note: n=8,524

*=Statistically significant

The first variable in column one of Table 39 represents the constant, the location of the regression line when it crosses the Y-axis. This is the predicted value of teacher overall rating of workshop quality when all other variables are 0. Table 39 then displays the values for the regression equation for predicting the dependent variable from the independent variable.

Only one of the variables in this model was found to be statistically significant. These findings indicate that if there is a one unit increase in facilitator rating of preparedness for teaching an OPD workshop, a significant .004 unit increase in teacher rating of his or her perception that he or she will enroll in a future OPD workshop. For every one unit increase in facilitator rating of training workshop effectiveness a non-significant .000 unit increase in teacher rating of perceived enrolling in a future eLearning for Educators workshop is predicted, holding all other variables constant. The third variable in the equation, facilitator rating of overall workshop effectiveness, follows the same trend of having a very small coefficient and being non-significant. A non-significant decrease of .005 can be seen in teacher perception of taking another workshop. Finally, the

fourth predictor variable is also non-statistically significant. For every one unit increase in facilitator rating of training workshop effectiveness, a non-significant 0.035 unit increase in teacher rating of perceived enrolling in a future eLearning for Educators workshop is predicted, holding all other variables constant.

The results of this analysis indicate that the higher that facilitators perceived their level of preparedness for facilitating an OTPD, the more likely the teachers in those facilitators' workshops indicated they were to enroll in a future OPD workshop.

In light of the very small levels of significance combined with the very small R squared in this model, the researcher cautions the reader that the findings may have statistical significance but lack practical significance.

Summary

This chapter delineates the chosen methods for analysis of each of the research hypotheses and their respective results. After building a hierarchical linear model to determine the intraclass correlation coefficient associated with teachers being nested within cohorts, it was determined that the most prudent method of analysis would be at the single teacher level. Therefore the researcher measured facilitator ratings of training workshop analysis as they related to teacher outcomes at the teacher level. Subsequently, five single level analyses were conducted in response to the five outlined research questions. The chosen single level analysis masked significant findings and future research may examine these data at other levels.

Prior to summarizing the results of this chapter a brief discussion on the difference between statistical and practical significance is necessary. The basis of testing statistical significance in inferential statistics is the premise that the sample statistic is

being compared to a population parameter. Generally, however, the population parameters are not known and are therefore estimated. In order for the population parameter estimation to be useful the sample statistics require statistical precision. Statistical precision is determined based on the sample size as well as variability within the sample. As statistical precision increases in strength so does the likelihood that a difference between the sample statistic and the population parameter will be statistically significant. It is very important to note that, in each of these research questions the sample sizes vary between 619 and 11,532. Each of the samples are large; some are very large. Given the statistics determined in each of the analyses, this researcher questions the practical significance of the statistically significant findings. This concern is discussed in detail in the final chapter of this dissertation.

The analyses revealed that based on the overall models, three of the five relationships examined were statistically significant. A multiple regression analysis was conducted to determine whether eLearning for Educator teachers' ratings of overall workshop quality were related to facilitator ratings of training workshop quality, facilitator ratings of perceived readiness to facilitate an online workshop, facilitators rating of perceived preparedness to facilitate an online workshop, and facilitator rating of training workshop effectiveness. The analysis revealed that the relationship was statistically significant ($F=3.676, p<.05$). The analysis also revealed that, when considered individually, the only variable in the equation that was statistically significant was facilitator rating of readiness to facilitate an OTPD workshop. While the overall model was statistically significant, it is important to note that the contribution of each of the variables was small as was the overall R square.

A logistic regression was conducted to determine whether eLearning for Educators teachers' likelihood of completing their chosen workshop was statistically significantly influenced by facilitator ratings of training workshop quality, facilitator ratings of perceived readiness to facilitate an online workshop, facilitators rating of perceived preparedness to facilitate an online workshop, and facilitator rating of training workshop effectiveness. The analysis revealed that when the predictor variables were included in the analysis, the model fit did not seem to be any better than the base model without the predictors included. The overall model was found to be statistically significant, and three of the four individual predictors were found to be statistically significant, however, so further research in this area is suggested.

A logistic regression was also conducted to determine whether eLearning for Educators teachers' likelihood of implementing the learned PD in the classroom was statistically significantly influenced by facilitator ratings of training workshop quality, facilitator ratings of perceived readiness to facilitate an online workshop, facilitators rating of perceived preparedness to facilitate an online workshop, and facilitator rating of training workshop effectiveness. The analysis revealed that the overall model was not statistically significant at the .05 level. The results further indicated that none of the individual predictors were statistically significant. The model with the predictors included was not a better fit than was the base model.

A multiple regression was conducted to measure whether there was a statistically significant relationship between teachers' ratings of perceived student impacts and facilitator ratings of training workshop quality, facilitator ratings of perceived readiness to facilitate an online workshop, facilitators rating of perceived preparedness to facilitate

an online workshop, and facilitator rating of training workshop effectiveness. The analysis revealed that the relationship was not statistically significant at the .05 level ($F=0.831, p=0.506$). Higher facilitator ratings of their training workshop are not statistically significantly related to teacher ratings of perceived student impacts.

Finally, a multiple regression was conducted to measure whether there was a statistically significant relationship between teachers' ratings of perceived likelihood of future enrollment and facilitator ratings of training workshop quality, facilitator ratings of perceived readiness to facilitate an online workshop, facilitators rating of perceived preparedness to facilitate an online workshop, and facilitator rating of training workshop effectiveness. The analysis revealed that the overall model was statistically significant at the .05 level ($F=2.766, p<.05$). Higher facilitator ratings of their training workshop are positively related to teacher ratings of perceived likelihood of future enrollment in an eLearning for Educators workshop. While the overall model was statistically significant, only facilitator rating of his or her level of preparedness to facilitate an OTPD workshop was statistically significant. Further, the contribution of this predictor variable was very small.

Chapter 5 will further discuss the findings presented here, the contribution of this research to the literature, and the use of multiple regression and logistic regression to evaluate the eLearning for Educators Facilitating and Implementing Online Professional Development workshop. Chapter 5 will also discuss the limitations of the presented study and suggest areas for future research.

Chapter 5: Discussion and Conclusions

This dissertation posed five research questions, each concerning how effectively training individuals to facilitate an eLearning for Educators OPD workshop influenced teacher perceived ratings of the OPD workshop. This chapter discusses the findings from Chapter 4 as they relate to the following research questions:

1. Are there facilitator training features or facilitator characteristics that can predict teacher ratings of an OTPD course?
2. Are there facilitator training features or facilitator characteristics that can predict teacher reported student achievement in the classroom?
3. Is the achievement facilitators report in their training course related to whether or not teachers complete their OTPD course?
4. Is the achievement facilitators report in a training course related to whether or not teachers implement the TPD content in their classroom?
5. Is the achievement facilitators report in a training course related to whether or not teachers enroll in a future OTPD course?

This final chapter will focus on a broader understanding of the meaning of the results presented in chapter 4. This chapter will also present possible support for the findings from the greater body of research. Although expected given the previous research, some of the findings have nevertheless added to the broader understanding of the topic in a number of ways such as what would be prudent to study in the future. Though many of the findings were surprising in that they were not statistically

significant, they each contribute to the understanding of online learning in new and different ways. This chapter will outline how. These more surprising findings have also led to suggestions for future research on this topic. Chapter 5 further discusses the limitations of this study, particularly having limited generalizability. Finally, this chapter presents a number of implications for future research. The chapter concludes with an overall summary of this dissertation.

In general, the exploratory research conducted for this dissertation concluded that effective online facilitator training focused on delivering OPD *can* be an indicator of teacher perceived effectiveness of the OPD workshop. This study provided significant contributions including a clearer understanding that the characteristics of the the eLearning for Educators facilitator training were related to perceived teacher effectiveness. Moreover, this study contributed a strong model, including instruments and appropriate analyses, for measuring the effectiveness of an online facilitator-training program. The facilitator variables selected for this research, however, were not sensitive enough to detect statistically significant differences among responses. It was determined that more sensitive variables should be selected for future research.

Prior to addressing the findings with regard to each of the research questions and hypotheses, it is important to discuss the difference between practical and statistically significant findings, as these differences are important for clearly understanding the results. To that end, a brief discussion about inferential statistics is necessary.

The basis of testing statistical significance in inferential statistics is the premise that the parameter is being estimated from the sample statistic. Generally, however, the population parameters are not known and are therefore estimated. In order for the

population parameter estimation to be useful the sample statistics require statistical precision. Statistical precision is determined based on the sample size as well as variability within the sample. As statistical precision increases in strength so does the likelihood that a difference between the sample statistic and the population parameter will be statistically significant.

As a result of population parameters being unknown, researchers test inferential statistics against a null hypothesis. That is if there is a statistically significant difference, this is a difference from the outcome observed in the results should there be no intervention, or effect of the intervention. To illustrate using variables in the current study, since the effect of online facilitator training was unknown, all test statistics were compared to a zero-value for this effect. Essentially what was being tested was that effectively training a facilitator to deliver OPD was not related to teachers' perceptions of the OPD workshop.

In all inferential statistics, less error present in the data is related to a greater chance of finding a statistically significant relationship if one exists in the population. Sample size is strongly related to the amount of error present. The closer the sample comes to the population, the less error, and the more likely a researcher is to find a statistically significant difference. Significant results, however, can be nearly impossible to find for very small sample sizes, regardless of the size of the effect. In this study each of the samples used to test the research hypotheses were between 670 and 11,500; these are large samples. It is therefore important to take caution when interpreting the results. With sample sizes this large and such a small effect being found, results may be statistically significant even when they are practically unimportant.

The concept of power is important to consider as well. Statistically significant findings rely heavily on the power of the study to reject the null hypothesis and find a difference if one does exist in the population. Power is again related to sample size. The larger the sample the more power in the statistical analysis.

Another important component of inferential statistics is the understanding that every individual in the population had an equal and independent chance of being selected to participate. It is only then that the results of the statistical tests will provide unbiased estimates of the true population parameters. A study's validity can be questioned should the sample not be truly random, because if not random the sample is more than likely non-representative of the population. In this study the samples were not entirely randomly selected from the population. As discussed in Chapter 3, the target population was all teachers who have taken or may take an eLearning for Educators OPD workshop. Each sample was, however, reduced due to certain restrictions such as failure to complete the pre-survey, for example. To that end not *all* individuals in the population had an equal and independent chance of being selected to participate in the study.

The various sample sizes in this study ranged from 650 to 11,500. With sample sizes this large, it is possible that small differences from zero are likely to be considered statistically significant. The statistical precision of these analyses may have been greater than what would have resulted from a smaller sample, and less power. Further, facilitators and teachers participated in the study due to their interest in participating in eLearning for Educators. Survey completion was expected of all participants, however many did not complete the surveys. Participants were not randomly selected from the

population. To that end use of inferential statistics in estimating population parameters is cautioned.

Although the cautionary warning of interpreting these findings due to sample size and non-random selection is apparent, as an exploratory study it is still important to consider consistent patterns in these findings. For example, the repeated positive effect associated with facilitator ratings of the training workshop and teachers' perceptions of the effectiveness of the OPD workshop should not be overlooked. Specifically, this chapter argues that the results of this study led to several important conclusions, and even if the overall significance of the models was due to the extremely large sample size, the patterns between facilitator ratings and teacher ratings provided a useful and practical view of the relationship between the two training workshops. Further, this study provided an appropriate model to use in future studies, and it contributed to the current body of literature.

Prior to discussing the individual results of the research questions, it is necessary to note the importance of the predictor variables selected. Each of the predictor variables in each research question surround a facilitator's perception of his or her level of confidence in delivering an OPD workshop. Variables used include: how facilitators rated the quality of the training course, how effective the training course was in preparing the facilitator to deliver the course, how ready the facilitator perceived himself or herself to be, and how prepared he perceives himself to be. These variables were selected because research on online facilitation has shown that one of the most important contributors to facilitator effectiveness is confidence in his/her skills and abilities. Yoder (2003) indicates that an effective facilitator must believe in him or herself to the point

that this confidence is transferred to the participants in the meeting or course and then they too, believe in the facilitator. A strong sense of confidence allows a facilitator to become energized and take on the challenging role of the leader.

Discussion of Research Findings

Ultimately the research findings in this dissertation indicated that facilitator ratings of workshop quality are significantly related to teacher ratings of workshop quality, likelihood of completing the OPD workshop, and teachers' likelihood of taking another OPD workshop. As the reader will see in this section, these findings were supported by the current literature and contributed to this literature by presenting a model to use to systematically examine these questions. Findings indicated that facilitator ratings of training workshop quality did not statistically significantly influence the likelihood of a teacher implementing the material in the classroom, and they were not statistically significantly related to teachers' perceptions of student benefits of the learned PD. These findings were surprising given the current literature in the field; however, they allowed the researcher to determine variables that did not influence completion and implementation and focus on other variables in future research.

The researcher first examined the effects of the facilitator-training course on teachers' perceptions of course quality. As was presented in Chapter 4, the null hypothesis for this research question was that there was no statistically significant relationship between facilitator ratings and teacher ratings of course-quality. After testing the hypothesis using a multiple regression analysis, it was determined that facilitator ratings of training workshop effectiveness were statistically significantly positively related to teacher ratings of workshop quality. When the individual

contribution of each predictor variable was considered, however, only one of the predictors was statistically significantly related to the outcome variable of interest.

A facilitator's perception of training workshop quality was positively related to teacher rating of OPD workshop quality at the .05 level, however the coefficient was not statistically significant. This trend was also true with facilitator perception of his or her level of preparedness to facilitate an OPD workshop, or the facilitator rating of the effectiveness of the training workshop. The only variable that was statistically significant, when holding all other variables constant, was facilitators' perception of his or her readiness to facilitate an online professional development workshop.

The facilitator readiness variable is made up of three items on the facilitator post-survey. Facilitators indicate how confident they feel to facilitate an online workshop, how familiar they are with the basic techniques to facilitating an OPD workshop, and how well they understand the responsibilities associated with facilitating an OPD workshop.

These results were expected based on the general body of previous research linking facilitator preparation to participant satisfaction (Bostrom et al., 1995; Brandt, 1997; Chang, 2001; Collision et al., 2000; Delfino et al., 2007; Stromso et al., 2007). Specifically, Delfino et al. (2007) concluded that an individual might be a veteran facilitator in a face-to-face classroom, and therefore assume that she will be a skilled OPD facilitator. However, whether an individual has delivered a face-to-face PD course in the past does not equip him with the skills necessary to satisfy the needs of an online learner.

Vonderwall et al. (2007) found, through their case study, that learning tools unique to online instruction, such as asynchronous discussion, must be completely understood and managed by the facilitator in order to best serve and satisfy participants. They further noted that a sound understanding of the pedagogical characteristics of online learning, such as those taught in the facilitator training class, are necessary for participant satisfaction.

Spitzer (1998) furthered this contention by noting, “those involved in distance education grossly underestimate the difficulty involved in changing deeply entrenched teaching and learning habits, and consequently we grossly underestimate the difficulty of changing from a traditional classroom environment to a distance learning context” (p. 53). Spitzer (1998) found that unless facilitators are specifically trained to deliver instruction in an online format, participants would not fully benefit from the education.

The skills taught in the eLearning for Educators facilitator training workshop were determined based on the previous research in the expectation that honing skills, such as making all participants feel comfortable even from a distance, monitoring and promoting participation, and understanding non-verbal cues over the computer, will promote participant satisfaction and course quality. The systematic research conducted on this topic determined that such an assumption was, in fact, true. The more confident a facilitator feels that he or she is armed with the tools necessary to effectively facilitate, the more satisfied the teacher participants will be. What this finding conveys is that the more honed a facilitator was in the skills and best practices associated with facilitator training and the more confident he or she felt about her or his skills to deliver an online course, the higher a teacher perceived the quality of the OPD course to be.

The positive trend associated with facilitator training effectiveness and participant satisfaction found in the current study was expected, and supported by the literature, as was the direction of the relationship. An increase in facilitator ratings of training workshop quality was positively related with teacher ratings of course quality. The researcher, however, cautions the reader when considering the practical significance of these findings. A random sample was not used, the sample was very large with very small effect sizes and the sample was restricted. As an exploratory study however, the research provides a greater insight into whether facilitator training should be researched further with regard to higher quality of OTPD workshop implementation and resulting teacher level of satisfaction in an OPD training workshop. The model developed contributes to the literature in that it provides systematic research with sound, concrete results. It further presents a model to be used in future research of course quality measurement.

The second research question addressed whether the combination of the facilitator measures of training workshop effectiveness were predictors of whether a teacher would complete the OPD workshop. More specifically:

How is teachers' completion of an OTPD course influenced by facilitators' self reported ratings of training workshop effectiveness, level of preparedness, level of readiness, and overall training course quality?

While the results from this logistic regression do not provide a definitive answer to this question, the findings do point in a favorable direction. A dichotomous variable was created to indicate whether a teacher had completed the OPD workshop, determined by whether or not he or she had completed the workshop post-survey. The maximum

likelihood estimate was produced and the pseudo-R squareds were determined. The determined statistics indicated that overall, the base model without any predictors included correctly predicted 79.7% of the total cases. The model was found to be statistically significant, and when considered individually, three of the four predictor variables were found to be statistically significant predictors of whether a teacher would complete the OPD workshop. Even given these findings, the model nevertheless did not fit better than the null model. With predictors included the model predicted 79.7% of cases correctly. As discussed previously, the statistical significance can be due to the extremely large sample size. The trend seen in this research question, however, cannot be overlooked.

When all of the predictor variables are combined they statistically significantly influence a teachers' likelihood of completing the OPD workshop. It is interesting, however, that the model including predictors did not correctly predict more cases as previous research gave the researcher reason to hypothesize it would. The trends seen in these findings, however, are important in that they indicate that future research on the relationship between facilitator training and teacher attrition indicate that some variables related to facilitator preparation would be related to teacher completion. Further, facilitator perception of preparedness, facilitator rating of training workshop effectiveness, and facilitator rating of overall training workshop quality being significant indicates that some relationship may be found using those variables.

Previous research indicates that one of the greatest barriers to enrollment in online learning is fear and anxiety of the unknown. As eLearning is such new territory and such little research has been done on the topic, many participants are concerned with whether

they will succeed in the online arena (Alderman et al., 2007; Alexander et al., 1994; Brandt, 2007; Denman et al., 2008; Ebersole, 2008). Each of the research studies conducted in this area notes that facilitators should be trained and prepared to display best practices for creating a warm and welcoming online training environment in order to make participants feel comfortable and curb anxiety. Further, a facilitator should learn how to convey a positive attitude and excitement even when face-to-face interaction is impossible. By indicating one's excitement through emoticons and comments, a facilitator is generating excitement and feelings of comfort with the participants. Learning how to combat the challenge of fear and anxiety will help promote participation and limit attrition. In his research, Hase (2003) found that facilitators who have been perceived by participants as emotionless evoke feelings of isolation, anxiety, and nervousness, ultimately resulting in a participant "going black" or dropping out of the course.

Promoting feelings of comfort aren't the only skills specific to online learning that high quality online facilitators should be taught prior to facilitating a workshop. In addition, facilitators must understand how to keep all participants engaged in order to not marginalize a single (or a group of) participant. If a participant feels as though he or she is not being engaged, that participant is more likely to drop out of the workshop. Novack et al. (2007) noted that a facilitator is to avoid providing assistance to individual participants without full group knowledge. That is, direct emails should not be sent to one participant in particular, because facilitators want to maintain engagement with the entire group. Further, Verdejo and Stefano (2006) cited Alexander et al. (1994) as indicating that community interactions in eLearning will not come to fruition should a

facilitator fail to understand the appropriate phrasing to use when posing a question or if they are unaware of the correct follow-up explanation to provide. Should a facilitator understand how to pose questions effectively and follow-up accurately, he or she will succeed in promoting communal discussion and critical thinking. These types of synchronous and asynchronous conversations will promote full group participation and in doing so combat attrition (Bostrom et al., 1995; Chang, 2001; Collision et al. 2000; Cosner & Peterson, 2003; Dennen et al., 2007).

As the background literature on the topic suggested that effective facilitator training would promote course completion, the significant results found in research question 2 were not surprising; however the overall model not predicting more cases correctly was. The trend is nevertheless important. The overall model indicates that as facilitators perceive themselves as being more prepared, the greater likelihood there is that a teacher would complete the training workshop. Further, the overall model indicates that the higher a facilitator rates the training workshop the greater the likelihood that teachers will complete the OPD workshop, indicating this variable should be considered in greater depth as well. The model further provides a base for collecting, analyzing, and interpreting future data in the area of researching teacher attrition in OPD workshops.

Thus, further research using similar variables seems warranted.

The third research question concerned whether the combination of the facilitator measures of training workshop effectiveness enhanced predictions of whether a teacher would implement the learned OPD material in the classroom. This research question was important because previous research has indicated that although some high quality professional development may be delivered to teachers, it is not an indicator of

implementation of the content by the teachers. This research question is attempting to determine variables that are related to teacher implementation of the OPD content.

The results from the logistic regression analysis provided the information necessary to answer this question. A dichotomous variable was created to indicate whether or not a teacher indicated she had implemented the learned material. This information came from one question on the Six Month Out Follow Up Survey that asked teachers to indicate whether they had implemented the material in the six months since they had completed the course. Although no studies in the literature could be found surrounding teacher implementation of OPD content, it was this researchers' expectation that higher facilitator ratings of training course quality would result in a greater likelihood a teacher would implement the OPD content in his or her classroom. The results of the logistic regression indicated that facilitator ratings did *not* statistically significantly influence whether a teacher implemented the material.

When the Base Model of the logistic regression was run to test the hypothesis in research question 3, 81.5% of cases were correctly classified. After the four predictor variables were included in the model 81.5% of cases remained correctly classified, however it is important to note that all cases were placed in the implementers group. The percent of accurate classifications did not change, none of the predictor variables were found to be statistically significant, nor was the overall model found to be statistically significant. Further the pseudo R-squared values were extremely small. These results indicate that this model is not a good fit.

While this model was found not to be statistically significant, the outcome of the analysis should not be overlooked. Important information with regard to teacher

implementation is gained from even non-significant findings. Although there was not a great deal of literature indicating that higher ratings of online facilitator training would be related to a greater likelihood of implementation, there was literature indicating that exploratory research to that end is beneficial.

Atkinson et al. (2007) conducted a research study in which they found that longitudinal professional development is more likely to lead to implementation in the classroom than is one-day professional development. The research study further found that professional development focused on community building and teacher networking is related to a greater likelihood of classroom implementation. The program studied in this dissertation was consistent with both of those findings. In addition, Peterson (2001) concluded from his qualitative research that professional development focused on a specific topic that is unique to teachers, and that which they select themselves, would result in a greater likelihood of implementation than would general professional development for all teachers. Again, eLearning for Educators follows this recommendation by making the professional development delivered area specific and selected by teachers. Delfino et al. (2007) concurred with these findings by concluding that online professional development that is teacher centered, longitudinal, specific to subject content, and longitudinal would promote classroom implementation. Although each of these findings was consistent with eLearning for Educators, nowhere in the previous research was a relationship between facilitation and implementation developed. It was from the previous literature and this gap that the topic of the relationship between facilitator training and classroom implementation was derived.

When considering these results it is important to note that there was very little variance in implementers across facilitators. It is likely that this lack of variance has contributed to the non-significant findings. It is also possible, however, that the variables selected as not good predictors of implementation.

The non-significant findings in this research question indicate that although facilitator-training ratings do not influence whether a teacher implements the material in the classroom, other variables in these data should be considered. Future research should focus attention not on facilitator ratings, but ratings more specifically associated with teacher ratings, such as whether the teacher's school promotes the use of this material in the classroom, or whether a teacher felt prepared to teach the material following the OPD workshop.

Similar to research question 3, results for the fourth research question were non-significant. The findings, nevertheless, act as an important contribution to current research in the field. The null hypothesis tested for this research question was that there was no statistically significant relationship between facilitator ratings of training workshop quality and teacher ratings of student achievement. After testing the hypothesis using a multiple regression analysis, it was determined that facilitator ratings of training workshop effectiveness were not statistically significantly related to teacher ratings of student benefits of the OTPD workshop. Further, none of the individual predictor variables were statistically significantly related to the outcome variable of interest.

A facilitator's perception of training workshop quality was not related to teacher rating of student achievement at the .05 level. This trend was also true with facilitator

perception of his or her level of preparedness to facilitate an OPD workshop, facilitators' perception of his or her level of readiness to facilitate an OPD workshop, and facilitator rating of the effectiveness of the training workshop. These results indicate that facilitators' understanding of the skills and best practices that are associated with, and unique to, online learning are not related to how teachers perceive their students benefiting from the OTPD workshop.

There was very little literature in the field suggesting that higher ratings of an online facilitator-training workshop would be related to higher ratings of teacher perception of student benefits. There were, however, studies indicating that a well-developed OPD workshop that was delivered by a trained facilitator would lead to student benefits (Dennen et al. 2007, Garet et al, 2001, Guskey, T.R & Huberman, M., 1995). The current body of literature lacked any research that examined a training program collecting data from facilitators being trained as well as from teachers taking workshops, and following up with them through their implementation of the professional development six months later. To that end, even these non-significant findings are an important contribution to the literature in the field.

These results demonstrate that training facilitators to manage an online teacher professional development program is not related to teachers' perception of student benefits. It remains important, however to continue to consider the eLearning for Educators project data for future research on relationships between the training program and whether students are benefiting from the learned PD. This relationship would build a strong case for promoting OPD in future programs.

The skills taught in the eLearning for Educators facilitator training workshop were determined based on previous research on online learning with the expectation that honing such skills will promote participant satisfaction. Satisfaction is challenging to measure, however previous research indicates that satisfaction with a PD training course can be defined by course completion, high ratings of course content, implementation of PD material in the classroom, and continuing to enroll in PD workshops. It was hypothesized, therefore, that if a facilitator is trained well to facilitate an OTPD workshop, participants will be satisfied and students will therefore benefit. This hypothesis, however, was not confirmed. The researcher, therefore, has eliminated the facilitator-training workshop as a possible catalyst for student benefits. However, she continues to consider other variables available in the eLearning data for building relationships between OTPD and student benefits, such as the effect of long term, individualized training.

As an exploratory study this research opens the doors to a new body of research relating online teacher professional development and student achievement. The model developed contributes to the literature in that it provides systematic research with sound, concrete results. It further presents a model to be used in future research of course quality measurement. Finally, it adds to the literature and promotes future research as will be discussed later in this chapter.

The final research question in this dissertation referred to the effects of the facilitator-training course on teachers' perception of future enrollment: Similar to each of the research questions developed for this dissertation, research question five was developed as a result of the current research in the field presenting indicators of

successful professional development. Another indicator of a successful professional development workshop is a teacher's enrollment in subsequent professional development workshops. The findings from this research question supported the current literature in the field and added to it by developing an appropriate model by which to measure this outcome.

The null hypothesis for this research question was that there was no statistically significant relationship between facilitator ratings and teacher perceptions of future enrollment. After testing the hypothesis using a multiple regression analysis, it was determined that facilitator ratings of training workshop effectiveness were statistically significantly positively related to teacher ratings of likelihood to enroll in a future OTPD workshop. When considered individually, however, only one of the predictor variables was statistically significant; however the overall R square was extremely small.

A facilitator's perception of training workshop quality was not related to teacher rating of likelihood of enrolling in a future OTPD workshop at the .05 level. This trend was also true for facilitators' perception of his or her level of readiness to facilitate an OPD workshop, and facilitator rating of the effectiveness of the training workshop. The only predictor variable that was significant when holding all other predictors constant was facilitator's perception of level of preparedness to facilitate an OTPD workshop. Although the predictor variable contributed very little to the overall explanation of the variance in the model, it was nevertheless statistically significantly positively related. These results indicate that facilitators' understanding of the skills and best practices that are associated with, and unique to, online learning are integral to participant rated likelihood of taking a future OTPD workshop.

These findings are not surprising given the current body of literature in the field. Previous literature indicates that a teacher is more likely to continue OTPD or enroll in a future OTPD workshop if he or she was satisfied with his or her experience in the previous OTPD workshop (Bernard et al. 2004). After an extensive literature review this researcher found that satisfaction in an online learning community is influenced by a facilitator's ability to adequately manage the community.

Knightley (2007) noted in her research that facilitators can make all participants feel more comfortable in an online community by welcoming them, introducing all participants, and making them feel like they are part of a community. These findings were consistent with the research of Appanana (2006), Atkinson & O'Connor (2006), as well as Sun et al. (2008). Each of these studies found that well trained facilitators are integral to participant satisfaction in that they help teachers stay connected and not feel "lost"; even though some may have significant hesitation about online learning formats.

One of the most significant barriers to online learning is self-direction and self-motivation (Knowles 1990). Adults, however, are understood to be self-directed learners, if what is expected of them is clearly defined and outlined by their facilitator (Hase 2003, p.3). Delfino et al. (2007) concluded that facilitators had to adjust their teaching style from that used in a face-to-face environment to one that would be effective in an online course in order to make learners who are not used to online learning feel more comfortable. These findings are consistent with those by Vonderwell et al. (2007) who, through their case study found that asynchronous learning tools, although extremely beneficial to online learning must be completely understood and managed by facilitators. They found that integral to best serving participants, facilitators must have a sound

understanding of the pedagogical characteristics of online learning and asynchronous communication tools. If a facilitator is not trained in the specific differences between managing an online course and managing a face-to-face course, teachers are likely to be unsatisfied with their training.

It is clear that if a facilitator is not prepared to assist his or her learners in this new and different environment participants will feel uncomfortable, isolated, and as though they are not gaining anything from the OTPD. If these are the results, teachers will be less likely to enroll in a future training workshop.

The positive trend associated with facilitator training effectiveness and participant rating of likelihood to enroll in a future OTPD workshop was expected, and supported by the literature, as was the direction of the relationship. As an exploratory study however, the research provides a greater insight into whether facilitator training should be researched further with regard to teacher likelihood of future enrolment and provides potential for future research in this area.

Limitations

Although the findings in this study substantially contribute to the current research on training to successfully facilitate online learning, limitations do exist which should caution the reader from drawing any definitive conclusions. Namely these limitations include: the study being exploratory rather than scientific, the study having limited generalizability, and the challenge of accurately defining “success.”

While a randomized controlled study is thought to act as the gold standard of research, exploratory research provides important insight into certain phenomena as well. There are similarities between controlled and exploratory studies. Such similarities

include: the research occurring in a fixed time, with fixed resources, and with boundaries of “good”, “acceptable”, and “non-acceptable” being set. The differences between the two types of studies, however, are more significant.

Exploratory research is generally used when the topic or issue being studied is new to the field. This is the case with examining the importance of training to facilitate in an online environment. Definitive conclusions cannot be drawn from exploratory research. Results are usually not useful for decision-making in and of themselves but can provide significant insight into the given situation. The greatest contribution from exploratory research is that it can take a problem that had not yet been clearly examined and help determine the best research design, data collection methods, and selection of subjects for future research. This study, although not providing definitive results, provides insight into a piece of online learning not yet studied in the greater body of literature. Exploratory research, however, is not typically generalizable to the population at large. Such is the case with this research.

Generalizability is essentially the approximate truth of conclusions. That is, it is the degree to which the conclusions in this study would hold for other persons in other places and at other times. In order to produce a study that would achieve generalizability, the researcher would determine the population, in this case it is all those individuals who may enroll in an eLearning for Educators workshop, and draw a fair sample from that population. The eLearning for Educators program is ongoing, however, and participants were selected from a particular timeframe. Further, none of the samples are fair or representative, because each sample was limited according to certain requirements.

Due to these shortcomings there are threats to external validity in this study. It can be argued that the results in this study are due to the unusual types of individuals who were in the study. For example, often teachers have to take the courses to complete the necessary credits to teach, or that the teachers were required to take the surveys in order to complete the workshop. The researcher is trying to generalize to the population of teachers who self select into eLearning for Educators so these restraints would not be common for all teachers.

It can also be argued that the results are due to the specific time frame in which these data were collected. As these data were collected in the first two years of program implementation, it can be argued that perhaps the scores would have been higher, if the data were collected after the program, and the facilitator-training course specifically, had matured past the first two years. Or possibly the scores may have been lower once the facilitators had worked for a few years and their enthusiasm had decreased. While the researcher would agree that this may be the case, as the reader will see in the section on future studies, the researcher looks forward to taking a sample of teachers and facilitators from across all five years of the grant and determining whether those results differ from the ones found here.

Finally, one could argue that these results are due to teachers being asked to take the surveys as a requirement for the course. The results, however, are not provided to the facilitator and are not used for decisions about promotion, demotion, or future employment. This is made very clear to teachers when they are completing the surveys.

The researcher took careful steps to combat threats to external validity. Each sample was described very carefully for each research question. Further, I have

continued to analyze collected data in the project to determine if there are substantial differences between those teachers and facilitators in this study and those who have taken the surveys since then. There have not been significant differences in the samples.

A final limitation in this study was the challenge of defining “perceived success” in a training workshop and teacher “success” in an OTPD program. The challenge of defining success can often act as a limitation. The researcher took care to define success in each of these cases based on the defined goals of both the facilitator course and the teacher course, as well as an extensive review of the current literature in the field.

Success in a facilitator-training workshop has been defined in the literature by a facilitator becoming an authority on the skills and best practices of facilitating an OTPD workshop as operationalized in the current literature. To specify, it is defined by facilitators’ understanding how to make all participants feel welcome and comfortable in their environment, managing synchronous and asynchronous discussion, maintaining participation, keeping a conversation dynamic without overtaking the discussion, and managing attrition. The level of a facilitator’s perceived success is measured by a facilitator rating his level of preparedness to facilitate an online workshop, level of readiness to facilitate an online workshop, of workshop effectiveness in conveying the skills and best practices necessary for facilitating an OTPD workshop, and overall rating of training workshop quality.

Success in an OTPD workshop has been defined by the current literature on teacher professional development. Current research indicates that successful teacher professional development is defined by how highly a teacher rates the workshop, whether the teacher completes the workshop, whether the teacher implemented the learned PD,

whether students benefit from the PD, and whether a teacher enrolls in a future OTPD workshop. Each of these indicators of success were examined in this dissertation.

Future Research

The most significant contributions of exploratory studies are the insights they provide into topics that have been examined very little in current research. This study is no exception. In addition to developing a model for examining an online facilitator training program and how perceived success in such a program is related to teacher participant satisfaction, this study also identifies aspects of online facilitator training that should be examined further. This researcher has used this exploratory study to develop a myriad of future research plans. These plans are discussed in the remainder of the section.

The first research question in this study examined how teacher ratings of overall workshop quality related to facilitator ratings of training workshop quality. Although the findings indicated that there was a statistically significant relationship, it is important to examine the data as they relate to those collected in a program that provides face-to-face facilitator training. In the future it would be prudent to conduct a randomized controlled study to compare findings from workshops that are lead by facilitators who completed an online training workshop and those that completed a face-to-face training workshop.

eLearning for Educators is an ongoing initiative. Since collecting the data used in this research, the program has adopted two new states and has continued collecting data from both the facilitator training workshops and the teacher training workshops. As the project has developed, the states have evolved how eLearning for Educators is

implemented in their state. Some states have begun training some of their facilitators in a face-to-face environment. As this method of training is not part of the eLearning for Educators model, those facilitators were not required to complete the survey; the teachers in their cohorts were however still required to take the survey. Moving forward I would recommend collecting survey data from facilitators who completed the face-to-face training workshop. The researcher would then randomly assign teachers in each state into facilitator cohorts. This will allow the researcher to compare results from the facilitator survey between those who took the face-to-face workshop and those who took the online workshop. This will further allow the research to examine the relationship between facilitator ratings of online training workshop quality and teacher satisfaction and the relationship between facilitator ratings of face-to-face training workshop quality and teacher satisfaction.

Due to the nature of the relationship determined in the current exploratory study, this future research is reasonable. The future research, however, would strengthen the current findings, as it would add the element of a randomized control study to the research design.

Facilitator ratings of training workshop quality did not statistically significantly influence the likelihood of a teacher completing the OPD workshop *or* the likelihood of a teacher implementing the learned PD in the classroom. These findings, although surprising, have lead this researcher to consider future research in this area. As previous literature has indicated that facilitator success is an indicator of workshop completion and teacher implementation, other facilitator variables should be examined to determine whether they influence the likelihood of teacher completion and implementation. For

example, it would be interesting to examine facilitators' cognitive outcomes to determine whether cognitive gains in the training course are related to teacher completion and implementation. Literature in the field has determined that if a facilitator is well versed on the content of the training workshop, the teachers in that workshop are more likely to remain engaged. Would these findings hold true if examining course completion and classroom implementation?

Six identical items on the eLearning for Educators Facilitator Training pre- and post-survey measure cognitive changes during the training course. In future research, it would be interesting to examine if these changes influence whether a teacher completes the course or implements the material? Are teachers with facilitators who made higher cognitive gains more likely to complete their training workshop course than teachers whose facilitators did not make such gains? Are teachers with facilitators who made higher cognitive gains more likely to implement the learned material in the classroom?

After conducting this study, it is this researcher's expectation that the more integral question remains: What facilitator variables are related to teachers' likelihood to implement the learned PD in the classroom? Previous research has shown that facilitator readiness is an indicator of teacher competency, understanding, and therefore implementation. It is this researcher's hypothesis then, that if a facilitator-training workshop can be adapted in response to findings that promote teacher implementation, student benefits will become apparent.

Conclusions

The research undertaken in completing this dissertation was influenced by the growing trend of delivering teacher professional development courses in an online

environment. As mentioned throughout this dissertation, due to budgetary constraints, school districts are looking toward forms of teacher training other than the traditional face-to-face professional development. Tremendous innovation in communication technologies over the past two and a half decades has significantly impacted all levels of education by providing opportunities for instruction and learning that is ubiquitous and pervasive; TPD has been no exception. Online professional development (OTPD) is emerging as a valuable and cost effective alternative to traditional face-to-face TPD courses.

Especially in this age of accountability, as a growing proportion of courses are being removed from the traditional classroom, it is important to understand how and to what extent training individuals to deliver instruction online benefits teacher participants. This issue was crucial to understand, given the large body of research outlining the differences between the skills and best practices needed to deliver instruction in a classroom and those needed to deliver instruction in an online environment.

Effective delivery of traditional, face-to-face TPD requires a set of specific skills. Many of those same skills are required for effective OTPD delivery; however teaching in an online environment requires facilitators to master additional skills and best practices (Stromso et al., 2007; Delfino & Persico 2007; Gaytan & McEwen 2007; Spatariu et al. 2007; Zembylas & Vrasidas 2007).

The skills and best practices for delivering instruction in an online environment do *not* parallel those necessary for teaching in a traditional classroom. Research has shown that merely mimicking face-to-face TPD in a virtual platform does not guarantee an effective TPD experience. Rather, the training provided to OTPD facilitators should

be dedicated to developing expertise in those techniques specific to online learning. Further, the training should occur online allowing facilitators to gain experience in the same setting in which they will be delivering TPD in order to experience first hand the challenges or frustrations their participants may face (Carter, 2004; Githens, 2007; Levenburg & Major, 2000; Singh et al., 2007; Singer, 2008; Zygouris, 1997). The goal of this dissertation was to approach these issues differently than what has been done before, and in doing so set the stage for future research into training individuals to deliver instruction online.

Currently, eLearning for Educators is one of the only programs that has developed, and requires the completion of, a Facilitating and Implementing Online Instruction course. It was imperative, therefore, that this course be systematically examined, so its benefits can be documented and its goals replicated. While this was an exploratory study, the results demonstrated interesting outcomes that should be researched further. Not only did this research find that effectively training to deliver instruction online positively related to teachers' perceptions of training workshop effectiveness, but it was positively related to teachers' likelihood of completing the workshop, teachers' perception of student effects, and teachers' reported likelihood of taking another OPD workshop. Each of these characteristics is found, in the literature, to be best practices related to teacher professional development. Interestingly, however, teachers' likelihood to implement the learned material in his or her classroom was not influenced by facilitators' rating of training workshop effectiveness. This finding was contrary to that uncovered in the literature, and may be explained by the voluntary sample of teachers who completed the Six Month Out Follow Up survey.

The teachers who elected to complete this survey may have biased the results. As teachers were not required to complete the follow-up survey it is plausible that teachers who were more strongly opinionated about the OPD workshop would be more likely to complete the follow-up survey. It is likely, then, that respondents would either strongly favor the learned OPD or be strongly negative about the OPD workshop. Responses on the follow up survey tended to be in the extremes. Results from only those participants, therefore, would not be representative of the entire population and may bias the results.

While only three out of the five research questions resulted in statistically significant findings with small effect sizes, all results are important to the future research of online learning. This dissertation designed a strong model for evaluating effective online facilitator training, which enabled a unique, multi-faceted approach based on participant satisfaction, participant completion, content implementation, student effects, and continued enrollment. Even though these measures were based on facilitator and teacher *perceptions* they do represent a new and significant approach to measuring effective facilitator training within an online learning community.

Furthermore, this dissertation explored the relationship outlined using data specifically gathered for the purpose of the evaluation of the eLearning for Educators initiative. To that end the researcher was able to better assess the nature of this complex issue.

In conclusion, this dissertation sought to explore the relationship between online facilitator training and teacher ratings of workshop effectiveness using a new approach to understanding effective OPD as a multi-faceted construct. As academic standards and the stakes related to teacher expectations and competencies are dramatically heightened

in this era of accountability, teacher professional development will continue to be a primary focus of education public policy. Further, as budgets are increasingly constrained school districts will look to alternative forms of pre- and in-service teacher professional development. OTPD is emerging as the most effective and economical alternative to traditional professional development. It is important, therefore, to ensure the individuals delivering the OPD are trained in the skills and best practices to do so. The research in this dissertation provides tools necessary to evaluate training programs and ensure they are being delivered with high quality. Should these tools not be used, however, this dissertation is still significant in that understanding the importance of being trained specifically to deliver professional development in an online environment is, and will continue to be, a crucial concern in educational research.

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Appendix A: Surveys

Facilitator Pre-Survey

1. Select the type of organization you primarily work for.
 - a. Elementary school
 - b. Middle school
 - c. High school
 - d. College/University
 - e. State Department of Education
 - f. Regional Service Agency
 - g. Regional Education Agency
 - h. Public Television Station
 - i. Other
Please specify:
2. What is your current title (or primary position)?
 - a. Elementary Teacher
 - b. Middle School Teacher
 - c. High School Teacher
 - d. College/University Instructor
 - e. Special Education Teacher
 - f. Library Media Specialist
 - g. Technology Coordinator
 - h. Curriculum Coordinator/Specialist
 - i. Professional Development Provider
 - j. Administrator
 - k. Other
 - l. Please specify: _____
3. With regard to computer use, how do you describe yourself?
 - a. Expert
 - b. Proficient
 - c. Intermediate
 - d. Novice
4. On average, how often do you use the Internet?
 - a. Several times a day
 - b. Daily
 - c. Several times a week
 - d. Weekly
 - e. Less than weekly
 - f. Never

5. How familiar are you with using a course management system (e.g., Blackboard, Desire2Learn)?
 - a. Very familiar
 - b. Somewhat familiar
 - c. Not very familiar
 - d. Not at all familiar
6. Have you ever taken an online course or workshop?
 - a. Yes
 - b. No

6a. If yes, how many?
7. Have you ever taught an online course or workshop?
 - a. Yes
 - b. No

7a. If yes, how many?
8. Have you ever developed an online course or workshop?
 - a. Yes
 - b. No

8a. If yes, how many?

For items 9-13, indicate the degree to which you agree or disagree with each statement using the scale:

- a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree.
-
9. In an online course, participant interaction is an essential element of learning.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
 10. An online facilitator is critical in helping online course participants form learning communities.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
 11. Online professional development courses can be as effective as traditional face-to-face professional development courses.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree

12. I am familiar with the basic techniques for facilitating an effective online course.
- Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
13. Online courses are less effective than traditional courses due to the lack of face-to-face communication.
- Strongly agree
 - Agree
 - Disagree
 - Strongly disagree
14. Indicate to what extent you anticipate needing training to perform each of the following facets of online course facilitation using the following scale:
- I need significant training
 - I need some training
 - I need little training
 - I need no training
- 14a. Recruiting participants
14b. Fostering communication between workshop participants
14c. Using primarily written forms of communication
14d. Handling low levels of participation
14e. Tracking the participation of workshop participants
14f. Judging the quality of online discussions
14g. Responding thoughtfully to participant postings
14h. Creating a supportive online environment
14i. Fostering an active online learning environment
14j. Assisting with participants' technical difficulties
14k. Using a course management system (e.g., Blackboard, Desire2Learn)
14l. Responding to participant questions about the content of a workshop
14m. Setting clear expectations for participants
14n. Evaluating the work of participants
15. From the list below, identify the essential features of an effective online professional development course (choose all that apply).
- Regular face-to-face contact
 - Content-rich participant interactions
 - Course sessions that emphasize abstract theories
 - Facilitators who model best practices
 - Application of course material to the classroom
16. Identify some of the potential advantages of online professional development courses over traditional, face-to-face courses (choose all that apply).
- Online course offerings can be made available over greater geographic distances.
 - Online course facilitation is less time intensive than face-to-face course facilitation.
 - Online courses provide more opportunities for students to work cooperatively than face-to-face courses.
 - Online courses provide increased potential for sustained discussions of topics.
 - Online professional development increases access to learning on a participant's own

schedule.

17. Identify key strategies that skilled facilitators use (choose all that apply):
 - a. Foster communication and collaboration among participants
 - b. Correct participants publicly for poor netiquette so all can learn
 - c. Model participation and discussion techniques for participants
 - d. Use email to encourage participation from participants who are not posting on the discussion board
 - e. Check the discussion board once a week
18. Identify the ways online course communications differ from face-to-face course communications. Online communications (choose all that apply):
 - a. are usually asynchronous.
 - b. lack nonverbal cues.
 - c. are bereft of humor.
 - d. don't reveal much about the personality of the facilitator.
 - e. are more conducive to the delivery of advanced content.
19. Identify key steps in *planning* for the successful launch of an online professional development course (choose all that apply).
 - a. Ensure all participants have adequate access to computers and the Internet.
 - b. Check all course links.
 - c. Develop workshop activities.
 - d. Post an orientation forum.
 - e. Develop a workshop facilitation timeline.
20. Identify some things a facilitator can do to make an online professional development course more accessible to participants with different learning styles (choose all that apply).
 - a. Ensure that participants are aware that the course content is primarily text-based.
 - b. Allow timid participants the opportunity to email their course contributions directly to the facilitator (bypassing the course management system).
 - c. Request that the body of participants' work in the course incorporate most of Gardner's identified multiple intelligences.
 - d. Communicate with participants via a variety of methods such as: email, synchronous chat, course announcements, and phone meetings.
 - e. Provide weekly bulleted summaries of the key concepts discussed in the discussion board.
21. List five effective ways to facilitate quality online communications.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
22. List four attributes of high quality online discussion threads.
 - a. _____
 - b. _____
 - c. _____
 - d. _____

23. Do you identify as Latino/Hispanic?
- a. Yes
 - b. No
24. Do you identify as (select all that apply):
- a. American Indian/Alaskan Native
 - b. Asian
 - c. Black/African American
 - d. Native Hawaiian/Pacific Islander
 - e. White
 - f. Other
 - g. Please Specify:
25. Do you identify as:
- a. Male
 - b. Female
26. What is your age?
- a. Under 25
 - b. 26-35
 - c. 36-45
 - d. 46-55
 - e. Over 55
27. Select the highest level of education you have completed.
- a. Bachelors
 - b. Masters
 - c. Certificate of Advanced Graduate Study (CAGS)
 - d. PhD/EdD
 - e. Other
Please specify:

Facilitator Post-Survey

Welcome to the post-course evaluation survey! This survey contains 27 questions divided into 7 pages. We estimate that it will take you 15-20 minutes to respond. Thank you!

2. Which online workshop will you be facilitating? (open-ended)
 3. Select the content area of the workshop you will be facilitating.
 - a. ELA
 - b. Math
 - c. Science
 - d. Social Studies
 - e. Classroom pedagogy
 - f. Technology
 - g. School design
 - h. Other
 - i. Please specify: _____
 4. Now that you have completed this training course, indicate how prepared you are to do each of the following using the scale below.
 - a. Very prepared
 - b. Prepared
 - c. Unprepared, I need some additional training or support
 - d. Very unprepared, I need significant additional training or support
- 3a. Foster communication between workshop participants
 - 3b. Use primarily written forms of communication
 - 3c. Handle low levels of participation
 - 3d. Track the participation of workshop participants
 - 3e. Judge the quality of online discussions
 - 3f. Respond thoughtfully to participant postings
 - 3g. Create a supportive online environment
 - 3h. Foster an active online learning environment
 - 3j. Assist with participants' technical difficulties
 - 3j. Use a course management system (e.g. Blackboard, Desire2Learn)
 - 3k. Respond to participant questions about the content of a workshop
 - 3l. Set clear expectations for participants

3m. Evaluate the work of participants

For items 4-9 indicate the degree to which you agree or disagree with each statement using the scale:

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

4. The content of the workshop I will be facilitating matches my educational background.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

5. The content of the workshop I will be facilitating matches my professional experiences.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

6. I am ready to facilitate an online workshop.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

7. I am familiar with the basic techniques for facilitating an effective online workshop.

- f. Strongly agree
- g. Agree
- h. Disagree
- i. Strongly disagree

8. I have a clear understanding of my responsibilities as a workshop facilitator.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

9. Online courses are less effective due to the lack of face-to-face communication.

- a. Strongly agree
- b. Agree
- c. Disagree

- d. Strongly disagree

For items 10-15 indicate the degree to which you agree or disagree with each statement using the scale:

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

10. In an online course, participant interaction is an essential element of learning.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

11. An online facilitator is critical in helping online course participants form learning communities.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

12. Online professional development courses can be as effective as traditional face-to-face professional development courses.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

13. This course encouraged participants to join a network of online facilitators for future support.

- e. Strongly agree
- f. Agree
- g. Disagree
- h. Strongly disagree

14. I received technical support when I needed it.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. I didn't need technical support

15. The course facilitator:

- a. Strongly agree

- b. Agree
- c. Disagree
- d. Strongly disagree

- 15a. provided prompt feedback.
- 15b. provided relevant feedback.
- 15c. was easily accessible for support.
- 15d. set clear expectations for participant involvement.
- 15e. modeled how to effectively conduct an online course.
- 15f. fostered an interactive classroom environment.

16. How effective was each of the following in your preparation to become a course facilitator:

- a. Extremely effective
- b. Effective
- c. Somewhat ineffective
- d. Not effective

- 16a. Course facilitator modeling how to manage online discussions
- 16b. Discussion topics
- 16c. Required readings
- 16d. Practice using a course management system (e.g. Blackboard, Desire2Learn)
- 16e. Asynchronous discussions
- 16f. Course activities and assignments
- 16g. Completing the course planning guide

17. Compared to your expectations before taking the course, how much work did this course require?

- a. Much more than I expected
- b. Somewhat more than I expected
- c. About the same as I expected
- d. Somewhat less than I expected
- e. Much less than I expected

18. Rate the overall quality of this course.

- a. Excellent
- b. Very Good
- c. Good
- d. Fair
- e. Poor

For items 19 - 25, choose ALL that apply.

19. From the list below, identify the essential features of an effective online professional development course (choose all that apply).

- a. Regular face-to-face contact

- b. Content-rich participant interactions
 - c. Course sessions that emphasize abstract theories
 - d. Facilitators who model best practices
 - e. Application of course material to the classroom
20. Identify some of the potential advantages of online professional development courses over traditional, face-to-face courses (choose all that apply).
- a. Online course offerings can be made available over greater geographic distances.
 - b. Online course facilitation is less time intensive than face-to-face course facilitation.
 - c. Online courses provide more opportunities for students to work cooperatively than face-to-face courses.
 - d. Online courses provide increased potential for sustained discussions of topics.
 - e. Online professional development increases access to learning on a participant's own schedule.
21. Identify key strategies that skilled facilitators use (choose all that apply):
- a. Foster communication and collaboration among participants
 - b. Correct participants publicly for poor netiquette so all can learn
 - c. Model participation and discussion techniques for participants
 - d. Use email to encourage participation from participants who are not posting on the discussion board
 - e. Check the discussion board once a week
22. Identify the ways online course communications differ from face-to-face course communications. Online communications (choose all that apply):
- a. are usually asynchronous.
 - b. lack nonverbal cues.
 - c. are bereft of humor.
 - d. don't reveal much about the personality of the facilitator.
 - e. are more conducive to the delivery of advanced content.
23. Identify key steps in *planning* for the successful launch of an online professional development course (choose all that apply).
- a. Ensure all participants have adequate access to computers and the Internet.
 - b. Check all course links.
 - c. Develop workshop activities.
 - d. Post an orientation forum.
 - e. Develop a workshop facilitation timeline.
24. Identify some things a facilitator can do to make an online professional development course more accessible to participants with different learning styles (choose all that apply).
- a. Ensure that participants are aware that the course content is primarily text-based.
 - b. Allow timid participants the opportunity to email their course contributions directly to the facilitator (bypassing the course management system).
 - c. Request that the body of participants' work in the course incorporate most of Gardner's identified multiple intelligences.
 - d. Communicate with participants via a variety of methods such as: email, synchronous chat, course announcements, and phone meetings.
 - e. Provide weekly bulleted summaries of the key concepts discussed in the discussion board.

Directions: For items 25-26, type a brief answer in the spaces below.

25. List five effective ways to facilitate quality online communications.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

26. List four attributes of high quality online discussion threads.

- a. _____
- b. _____
- c. _____
- d. _____

27. Please provide us with any additional feedback you'd like to share on your experience in the facilitator training course. [Open Response]

You have finished the course evaluation survey. Thank you for your time!

Teacher Pre-Survey

Welcome to the Teacher Online Professional Development Pre-Survey. This pre-survey contains 22 questions divided into 5 pages. We estimate that it will take you 10 – 15 minutes to respond. Thank you!

Teacher Workshop Pre-Survey Page 1 of 5

1. Is English your first language?
 - a. Yes
 - b. No
2. Do you identify as Latino/Hispanic?
 - a. Yes
 - b. No
3. Do you identify as: (Select all that apply.)
 - a. American Indian/Alaskan Native
 - b. Asian
 - c. Black/African American
 - d. Native Hawaiian/Pacific Islander
 - e. White
 - f. Other
 - g. Please specify:
4. Do you identify as:
 - a. Male
 - b. Female
5. What is your age
 - a. Under 25
 - b. 26 – 35
 - c. 36 - 45
 - d. 46 – 55
 - e. Over 55
6. Select the highest level of education you have completed.
 - a. Associates
 - b. Bachelors
 - c. Masters
 - d. Certificate of Advanced Graduate Study (CAGS)
 - e. PhD/EdD

- f. Other
7. Have you ever taken a course or workshop (online or face-to-face) that focused on the subject area of this workshop?
- a. No
 - b. Yes
- 7a. If yes, how many?
- 7b. If yes, when did you take your most recent course/workshop in this subject area?
- i. Within the past year
 - ii. 1-5 years ago
 - iii. More than 5 years ago
8. Have you ever taken an online course or workshop?
- a. Yes
 - b. No
- 8a. If yes, how many?
9. How many years of teaching experience do you have? (Please specify number.)
10. How many years have you taught at your current district? (Please specify number.)
11. Do you hold a state certification for your current work title?
- a. Yes
 - b. No**
12. What is your current title? (Select the closest title.)
- a. Administrator
 - b. College Instructor
 - c. High School Teacher
 - d. Middle School Teacher
 - e. Elementary Teacher
 - f. Pre-K Teacher
 - g. Other
 - h. Please Specify

13. If you teach, please select your primary teaching area:
- a. Generalist (I teach many subject areas.)
 - b. English Language Arts
 - c. Math
 - d. Science
 - e. Social Studies
 - f. Foreign Language
 - g. Special Education
 - h. English Language Learners
 - i. Resource Personnel (e.g., Library, Media, Technology)
- 14a. Approximately what proportion of your students receives free/reduced lunch?
- a. 0-25%
 - b. 26-50%
 - c. 51-75%
 - d. 76-100%
- 14b. Approximately what proportion of your students passed your state exam last year?
- a. 0-25%
 - b. 26-50%
 - c. 51-75%
 - d. 76-100%**
15. Based on the workshop description, how knowledgeable are you in the workshop content?
- a. Very knowledgeable
 - b. Knowledgeable
 - c. Somewhat knowledgeable
 - d. Not knowledgeable
16. What are your expectations for this workshop? (Select all that apply.)
- a. To learn new subject-area content
 - b. To gain insight into new or different approaches to teaching
 - c. To become more comfortable with technology
 - d. To help my students become more comfortable with technology
 - e. To understand how online learning takes place
 - f. To engage in a learning community with colleagues
17. I expect to implement what I will learn in this workshop in my classroom.
- a. Yes
 - b. No
18. What incentives will you receive for taking this professional development workshop? (Select all that apply.)
- a. Money

- b. Course credit towards degree
- c. Credit towards certification
- d. Professional development point(s)
- e. Continuing education unit(s)
- f. None
- g. Other

19. I learn best by: (Select all that apply.)

- a. having access to highly organized courses or materials.
- b. listening to others discuss material.
- c. discussing material.
- d. reading.
- e. seeing pictures, graphs, or movies.
- f. trying out new methods myself.
- g. watching a live demonstration.
- h. working alone.
- i. working with others.

20. Online professional development workshops can be as effective as traditional face-to-face professional development workshops.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

21. How proficient are you at performing each of the following: [Highly proficient, Proficient, Somewhat proficient, I don't know how yet]

- a. Highly proficient
- b. Proficient
- c. Somewhat proficient
- d. Not proficient
- e. I don't know yet

22a. Navigating websites

22b. Performing an Internet or library search for educational resources

22c. Downloading documents

22d. Uploading documents

22e. Reading a threaded discussion

22f. Posting comments to a threaded discussion

22g. Installing support programs (e.g. QuickTime, RealPlayer, Flash, Java, etc.)

22h. Troubleshooting computer problems

22. Briefly describe what you hope to get out of this workshop.

Teacher Post Survey

Enter Survey Here:

Welcome to the Teacher Professional Development Workshop Post-Survey! This survey contains 33 questions divided into 7 pages. We estimate that it will take you 15-20 minutes to respond. Thank you!

1. Having completed the workshop, how knowledgeable are you about the content presented in this workshop?
 - a. Very knowledgeable
 - b. Knowledgeable
 - c. Somewhat knowledgeable
 - d. Not knowledgeable
2. The content of this workshop is easily transferable to the classroom.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
3. Which of the following occurred as a result of this workshop? (Select all that apply.)
 - a. I learned new subject-area content.
 - b. I gained insight into new or different approaches to teaching.
 - c. I became more skilled at using technology.
 - d. I use (or will use) technology more often with my students than I did before taking the workshop.
 - e. I have a better understanding of how online learning takes place.
4. Rate the effectiveness of each workshop component in helping you learn the workshop material.
 - a. Very effective
 - b. Effective
 - c. Ineffective
 - d. Very ineffective
 - e. Not applicable
 - 4a. Session readings
 - 4b. Additional resources and links
 - 4c. Workshop activities
 - 4d. Online discussions
 - 4e. Face to face meetings
 - 4f. Creating a usable project by the end of the workshop
 - 4g. Collaborating with other participants
 - 4h. Videos

5. How much work was required during this workshop?
 - a. Too much
 - b. The right amount
 - c. Too little
6. How difficult was this workshop? [Too difficult, Just right, Too easy]
 - a. Too difficult
 - b. The right amount of difficulty
 - c. Too easy

For items 7–11, indicate the degree to which you agree or disagree with each statement using the scale below.

7. The workshop goals were clearly stated.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
8. The expectations for workshop participation were clear.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
9. The workshop was well-organized.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
10. The workshop website was user-friendly.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
11. The workshop materials were culturally unbiased.
 - a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree

12. Do you identify yourself as having a visual impairment or physical disability?

[Yes, No]

- a. Yes
- b. No

12a. If yes, rate the accessibility of this course.

- a. Very accessible
- b. Accessible
- c. Inaccessible
- d. Very inaccessible

13. Rate the overall quality of this workshop. [Excellent, Very good, Good, Fair, Poor]

- a. Excellent
- b. Very good
- c. Good
- d. Fair
- e. Poor

14. Briefly describe the most innovative feature of this workshop. <value=string>

14a. How effective was this innovative feature in helping you learn the workshop material?

- a. Very effective
- b. Effective
- c. Ineffective
- d. Very ineffective

For items 15–17 indicate the degree to which you agree or disagree with each statement using the scale below.

15. This workshop was aligned with my school's professional development needs or plans.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

16. This workshop addressed areas of curricular and/or pedagogical need in my school or district.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

17. The workshop effectively linked pedagogical skills with content.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

For items 18–19 indicate the degree to which you agree or disagree with each statement using the scale below.

18. My technical abilities were adequate to participate in this workshop.
- a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
19. I had access to technology that allowed me to fully participate in this workshop.
- a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
20. Was technical assistance available throughout this workshop? [Yes, No, I never needed it]
- a. Yes
 - b. No
 - c. I never needed it
- 20a. If you needed technical assistance and were unable to obtain it, please explain what happened.
21. How successful were you at accessing the workshop from the following venues:
[Very successful, Somewhat Successful, Unsuccessful, I never tried this venue]
- a. Very successful
 - b. Somewhat successful
 - c. Unsuccessful
 - d. I never tried this venue.
- 21a. Home
- 21b. Your classroom
- 21c. The school computer lab or other school computer area.
- 21d. The local library
- 21e. Other
- 21f. If other, please specify venue: _____
22. Which of the following technical skills were improved by taking this workshop?
(Select all that apply.)
- a. Navigating websites
 - b. Performing Internet or library searches for educational resources

- c. Downloading documents
 - d. Uploading documents
 - e. Reading a threaded discussion
 - f. Posting comments to a threaded discussion
 - g. Installing support programs (e.g. QuickTime, RealPlayer, Flash, Java, etc.)
 - h. Troubleshooting computer problems
23. I received adequate credit or compensation for taking this workshop.
- a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
24. On average, how many hours per week did you spend: \
- a. participating in online communications (e.g. discussion board, chat room, e-mail, etc.)
25. How likely are you to take another online professional development workshop?
[Very likely, Somewhat likely, Somewhat unlikely, Very unlikely]
- a. Very likely
 - b. Somewhat likely
 - c. Somewhat unlikely
 - d. Very unlikely
26. Online professional development workshops can be as effective as traditional face-to-face professional development workshops.
- a. Strongly agree
 - b. Agree
 - c. Disagree
 - d. Strongly disagree
27. What are the advantages of taking an online professional development workshop over taking a face-to-face workshop? (Select all that apply.)
- a. The ability to work according to my own schedule
 - b. Not having to travel
 - c. Accessibility from geographically remote locales
 - d. Less expensive
 - e. Interactions with participants who have diverse perspectives
 - f. More time to reflect on materials and/or discussions
 - g. Experiencing technology from a student perspective
 - h. Improving technical and/or Internet skills
 - i. Feeling somewhat anonymous
 - j. Access to content not available locally
28. To what extent did the following interfere with your participation in this workshop? [A great deal, Somewhat, Not that much, Not at all]

- a. A great deal
- b. Somewhat
- c. Not that much
- d. Not at all

- 28a. Fitting the workshop requirements in with other professional commitments
- 28b. Fitting the workshop requirements in with general schedule
- 28c. Experiencing anxiety about taking an online workshop
- 28d. Learning the workshop content
- 28e. Having adequate technical skills
- 28f. Experiencing technical difficulties
- 28g. Working with the online workshop format

For items 29–31 indicate the degree to which you agree or disagree with each statement using the scale below.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

- 29. The facilitator was knowledgeable in this content area.
- 30. The topics chosen for discussion were relevant.
- 31. The topics chosen for discussion were beneficial.

32. How successful was the facilitator at: [Very successful, Successful, Unsuccessful, Very unsuccessful]

- a. Very successful
- b. Successful
- c. Unsuccessful
- d. Very unsuccessful

- 32a. setting a welcoming tone for the workshop?
- 32b. providing helpful feedback?
- 32c. clearly communicating expectations for activities?
- 32d. keeping discussions on-topic?
- 32e. fostering stimulating discussions?
- 32f. encouraging active participation?
- 32g. being accessible for support?

33. Please feel free to share any additional comments you have on your online professional development workshop.

Teacher Six Month Out Follow Up Survey

Enter Survey Here:

Directions: Please read and respond to each survey item.

The first set of eleven items asks you about issues surrounding the use of the e-Learning for Educators workshop content in your classroom. The second set of items asks about your actual or planned use of the workshop content in class.

Two optional items ask you to share electronic documents related to the workshop delivery in your classroom – please upload this material if it is readily available at your computer; if not, just move to the next item (We'd like to thank you in advance for your trouble in uploading these documents. They will be of great use in describing specific impacts of the workshop!)

1. Now that some months have passed since taking the workshop, rate how knowledgeable you feel about the workshop content?

- a. Very knowledgeable
- b. Knowledgeable
- c. Not very knowledgeable
- d. Not knowledgeable at all

For items 2 through 5, indicate your level of agreement with each statement.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree

2. This workshop content is (was) easy to transfer to my classroom instruction.

3. My school supports the use of this workshop content in my classroom instruction.

4. The workshop addressed areas of content and/or pedagogical need in my students.

5. This workshop enabled me to improve my classroom instruction.

6. How well did this workshop prepare you to do the following in your classroom:

- a. Very well
- b. Moderately well
- c. Not very well
- d. Not well at all

6.1. Implement new methods of teaching.

6.2. Implement lessons focused on state standards.

6.3. Integrate instructional technology into class lessons.

6.4. Integrate new student assessment techniques.

6.5. Address the needs of students with diverse cultural backgrounds.

6.6. Address the needs of students with diverse learning needs.

6.7. Address the needs of students with disabilities.

7. What workshop changes might have improved your use of the workshop content in your class? (Select all that apply.)

- a. No changes are necessary. I was able to use the workshop content with my class easily.
- b. The workshop content could have focused on a higher grade level
- c. The workshop content could have focused on a lower grade level
- d. The workshop content could have focused more on instructional practices.

- e. The workshop content could have focused more on course content.
- f. The workshop content could have focused more on state standards.
- g. The workshop content could have been more exciting for the teachers taking the workshop.
- h. Other.
- i. If other, please describe briefly.

8. What type of additional support would have been most beneficial in helping you implement the workshop content into your class instruction? (Select all that apply.)

- a. I needed no additional support transferring the workshop content into my class lesson
- b. I would have liked to have additional resources for classroom use.
- c. I would have liked to have additional modeling in the workshop (“how-to” instructions)
- d. I would have liked more on-going support from other teachers taking the workshop (including teachers in my school).
- e. I needed more experience working with the material in the workshop.
- f. Other

If other, please describe briefly.

9. What one area of classroom instruction has improved most as a result of taking this workshop? (Select one.) The workshop has helped improved my delivery of:

- a. instructional technology.
- b. course content.
- c. instructional methods.
- d. student assessment.
- e. other.
- f. My classroom instruction has not improved as a result of taking this workshop.

10. Indicate whether you have shared this workshop content with other educators. (Select all that apply.) I have shared this workshop content with:

- a. no teachers or administrators
- b. teachers at my grade level
- c. teachers in my building (across grade levels)
- d. teachers in my district
- e. administrators in my building and/or district
- f. teachers in my state

11. If you have shared the workshop content with teachers or administrators, please indicate how you did this. (Select all that apply.) I shared the workshop content through:

- a. informal discussions with colleagues.
- b. a discussion(s) at a grade-level planning meeting.
- c. a presentation(s) at a school-level or district staff development meeting.
- d. a meeting with school/district administrators.
- e. materials I prepared and shared with other teachers and/or administrators.
- f. a formal presentation or lecture I prepared and delivered.

12. Will you use (have you used) this workshop content with your students this year? (Select one.)

- a. Yes, I’ve already used this material with my class this year.
- b. Yes, I plan on using this material with my class this year.
- c. I probably won’t use this material with my class this year, but I may use it next year.
- d. No, I definitely won’t use this material with my class this year or next year.

13. Select the grade level(s) at which you will use (have used) the workshop content. (Select all that apply.)

- a. Preschool
- b. K – 3
- c. 4 – 5

- d. 6 – 8
- e. 9 – 10
- f. 11 – 12
- g. None of these

14. Estimate the number of students who will experience (have experienced) this workshop content this year.

- a. 1-20
- b. 21-40
- c. 41-60
- d. 61-80
- e. 81+

15. Estimate the degree to which you'll use the workshop content in your class this year:

- a. Minimal usage
- b. Moderate usage
- c. Strong usage
- d. Extremely strong usage

16: Indicate the primary way you are using (have used) the workshop content with your students. (Select one.) I plan on incorporating (have incorporated) the material into:

- a. everyday lessons on a variety of topics.
- b. discrete, stand-alone lesson plans designed to feature this material
- c. a complete unit designed to feature this material

17: OPTIONAL: You may attach ONE representative example of a lesson segment, lesson plan or unit section that illustrates your use of the workshop content in your class. <<<<Place to upload one document>>>>

18: Compared to past experiences with students, indicate any changes you've observed in this year's students when using the current workshop content in class. Please answer by selecting your level of agreement with each statement.

- a. Strongly agree
- b. Agree
- c. Disagree
- d. Strongly disagree
- e. Not applicable

18.1. Students appeared more interested in the classes when I used the workshop contents/approaches.

18.2. Students worked together more cooperatively in the classes when I used the workshop contents/approaches.

18.3. Student diverse learning needs were addressed better in classes using the workshop contents/approaches.

18.4. Students showed better academic performance in the targeted content using the workshop contents/approaches.

18.5. Students performed more difficult (in-depth) work in classes using workshop contents/approaches.

18.6. Student products were of a higher quality in classes using the workshop contents/approaches.

19: You may attach ONE representative example of a student outcome here (e.g., an example of a scanned work product or another type of student response to the material). <<<<Place to upload one document>>>>

20. Please describe another major impact of the workshop on your teaching or your class not already brought up in this survey: <Open response.>

13(2). What is the reason(s) for not using this workshop content with your class this year? (Select all that apply.)

- a. The workshop content is too easy for my students.
- b. The workshop content is too advanced for my students.
- c. The workshop content is not relevant to my students.
- d. My school or district does not support the use of this workshop content with my class.
- e. My class schedule is too full to incorporate this new workshop content.
- f. I prefer to stick with past approaches to teaching this workshop content.
- g. Other
- h. If other, please describe briefly.

Appendix B

Complete Background and Demographic Information for Samples

Table 1.
Breakdown of Teacher Demographics in Research Question Two

Teacher Demographics		
Gender	#	%
Female	9638	84
Male	1824	16
Missing System	70	1
Age	#	%
Under 25	857	7
26-35	4060	35
36-45	2945	26
46-55	2693	23
Over 55	944	8
Missing System	33	0
Race/Ethnicity	#	%
Latino/Hispanic	166	1
American Indian	126	1
Asian	29	0
Black	2233	12
Native Hawaiian	5	0
White	9057	78
Other	136	1
English as First Language	#	%
Yes	11393	98
No	122	1
Missing System	17	0
Note: n=11532		

Table 2.
Breakdown of Teacher Background Characteristics in Research Question Two

Teacher Background Characteristics		
	#	%
Highest Level of Education		
Associates	96	0
Bachelors	5450	47
Masters	514	5
CAGS	101	1
PhD/EdD	827	7
Other	4519	39
Missing	25	0
Current Title		
Administrator	523	5
College Instructor	6	0
High School Teacher	3022	26
Middle School Teacher	2590	23
Elementary Teacher	3195	28
Pre-K Teacher	124	1
Other	1844	16
Missing	228	2
State Certificate		
Yes	10333	90
No	1128	10
Missing	71	1
n=11532		

Table 3.
Breakdown of Teacher Experience Characteristics in Research Question Two

Teacher Experience Characteristics		
	#	%
Taken a Course in This Subject		
Yes	7018	61
No	4476	39
Missing	38	0
Taken an Online Workshop		
Yes	2676	23
No	8842	77
Missing	14	0
n=11532		

Table 4.
Breakdown of Teacher Demographics in Research Question Three

Teacher Demographics			
		#	%
Gender			
	Female	791	86
	Male	123	13
	Missing System	3	0
Age			
	Under 25	54	6
	26-35	226	25
	36-45	215	23
	46-55	313	34
	Over 55	108	12
	Missing System	1	0
Race/Ethnicity			
	Latino/Hispanic	10	1
	American Indian	13	1
	Asian	1	0
	Black	91	10
	Native Hawaiian	1	1
	White	807	88
	Other	9	1
English as a First Language			
	No	903	1
	Yes	12	99
	Missing System	2	0

Note: n=917

Table 5.
Breakdown of Teacher Background Characteristics in Research Question Three

Teacher Background Characteristics			
		#	%
Highest Level of Education			
	Associates	9	1
	Bachelors	337	37
	Masters	58	6
	CAGS	12	1
	PhD/EdD	92	10
	Other	406	44
	Missing	3	0
Current Title			
	Administrator	67	7
	College Instructor	0	0
	High School Teacher	244	27
	Middle School Teacher	192	21
	Elementary Teacher	197	21
	Pre-K Teacher	5	1
	Other	188	21
	Missing	24	3
State Certificate			
	Yes	851	93
	No	58	6
	Missing	8	1

Note: n=917

Table 6.
Breakdown of Teacher Experience Characteristics in Research Question Three

Teacher Experience Characteristics		
	#	%
Taken a Course in This Subject		
Yes	212	23
No	702	77
Missing		
Taken an Online Workshop		
Yes	519	57
No	395	43
Missing	3	0

Note: n=917

Table 7.
Breakdown of Teacher Background Characteristics in Research Question Four

Teacher Background Characteristics		
	#	%
Highest Level of Education		
Associates	4	1
Bachelors	231	36
Masters	44	7
CAGS	10	2
PhD/EdD	69	11
Other	277	43
Missing	3	1
Current Title		
Administrator	54	9
College Instructor	0	0
High School Teacher	177	28
Middle School Teacher	143	22
Elementary Teacher	132	21
Pre-K Teacher	4	1
Other	113	18
Missing	15	2
State Certificate		
Yes	599	94
No	34	5
Missing	5	1

Note: n=683

Table 8.
Breakdown of Teacher Experience Characteristics in Research Question Four

Teacher Experience Characteristics		
	#	%
Taken a Course in This Subject		
Yes	166	26
No	469	74
Missing	3	0
Taken an Online Workshop		
Yes	369	58
No	267	42
Missing	2	0

Note: n=683